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INSTALLATION RESTORATION PROGRAM
ACTION MEMORANDUM
SPILL SITE SS-010
HEAVY EQUIPMENT MAINTENANCE FACILITY
PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

Contract No. F41624-94-D-8106
Delivery Order 003
CDRL # A030
Document Control # 069

Submitted to:

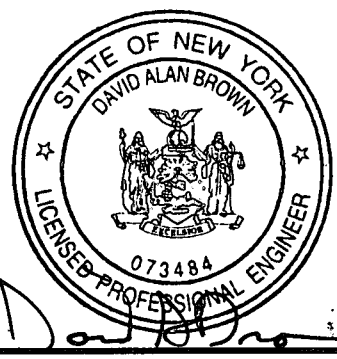
Air Force Center for Environmental Excellence
Brooks Air Force Base
San Antonio, Texas

Submitted by:

Parsons Engineering Science, Inc.
Liverpool, New York

and

OHM Remediation Services Corp.
Austin, Texas



David A. Brown, P.E.
Project Manager

SEPTEMBER 17, 1996

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ACTION MEMORANDUM
DECLARATION STATEMENT

Installation Restoration Program
Spill Site SS-010, Heavy Equipment Maintenance Facility
Plattsburgh Air Force Base, Plattsburgh, New York

1.0 STATEMENT OF BASIS AND PURPOSE: This decision document represents the selected removal action for Spill Site SS-010 at Plattsburgh Air Force Base (PAFB), New York, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended, and not inconsistent with the National Contingency Plan (NCP). This decision is based on the administrative record for the site.

2.0 ASSESSMENT OF THE AREA: Conditions presently exist at PAFB Installation Restoration Program (IRP) Spill Site SS-010 which, if not addressed by implementing the response action documented in this Action Memorandum, will lead to (1) actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, and (2) migration to the local groundwater of high levels of additional hazardous substances or pollutants or contaminants.

3.0 DESCRIPTION OF THE PREFERRED ALTERNATIVE: The preferred removal action alternative addresses the principle threat of Spill Site SS-010 by removing the volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) present in vadose zone soils. The preferred alternative for Site SS-010 vadose zone soils is based on available site information and will follow the Presumptive Remedy Approach (EPA 540-F-93-048). The preferred removal action at Spill Site SS-010 will include two scenarios which are based on the constituent contaminants. Two types of contaminated soil have been identified at Spill Site SS-010; soil containing primarily fuel-related compounds with low levels of trichloroethene (TCE), and soils containing only fuel-related compounds. Based on the two soil contaminant types, the two remedial scenarios include:

- For soils that contain TCE above 0.5 mg/l as determined by the Toxicity Characteristic Leaching Procedure (TCLP), the soil will be excavated and treated off-site to remove the TCE via thermal desorption at a licensed New York State treatment facility. The thermally treated soil will be disposed of in a New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (USEPA) licensed treatment, storage or disposal (TSD) facility.
- For soils that do not contain TCE above 0.5 mg/l as determined by TCLP, the soil will be excavated and treated separately at the base landfarm operation that will be located at the former Alert Area on the flightline. Once treatment of the soil is complete (i.e. meets NYSDEC TAGM HWR-94-4046), the soil will be used as fill material within the former base boundaries.

Under both scenarios, excavation and remediation of the vadose zone soils at Spill Site SS-010 at PAFB will be considered complete when the recommended cleanup

levels as specified under NYSDEC Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046 are met at the excavation limits. Post-excavation confirmatory sampling will be conducted to confirm that the cleanup objectives have been met. It is anticipated that the confirmatory sampling will include the collection of one sample every 50 feet along the excavation limits for analysis of target analytes (i.e. TCE, ethylbenzene, xylenes, benzo(a)anthracene, and benzo(a)pyrene). These target analytes were selected based on the results of previous site investigations and the recently completed delineation investigation.

4.0 STATUTORY DETERMINATION: The preferred remedial alternative protects human health and the environment, complies with applicable or relevant and appropriate federal and state requirements (ARARs), and is cost-effective. In addition, the remedial alternative satisfies the statutory preference for remedies that reduce the toxicity, mobility, or volume of hazardous substances.

Michael D. Sorel — 18Sep96

Michael D. Sorel — Date

BRAC Environmental Coordinator

Title

SECTION 1

INTRODUCTION

1.1 INTRODUCTION

Plattsburgh Air Force Base (PAFB) is undertaking a "time critical" removal action at Spill Site SS-010 located at PAFB in Plattsburgh, New York (Figure 1.1). This removal action is being undertaken to remove volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) from soils above the groundwater table (i.e. the vadose zone soils) at the site. This removal action will also prevent further contamination of the local groundwater with VOCs and SVOCs emanating from the site soils. This Action Memorandum has been prepared to document the proposed removal action to address the vadose zone soil contamination. The proposed removal action includes two remedial scenarios to remove VOCs and SVOCs from the site soils. The two scenarios are based on the type of contaminants contained within the site soils and include:

- For soils that contain TCE above 0.5 mg/l as determined by the Toxicity Characteristic Leaching Procedure (TCLP), the soil will be excavated and treated off-site to remove the TCE via thermal desorption at a licensed New York State treatment facility. The thermally treated soil will be disposed of in a New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (USEPA) licensed treatment, storage or disposal (TSD) facility.
- For soils that do not contain TCE above 0.5 mg/l as determined by TCLP, the soil will be excavated and treated separately at the base landfarm operation that will be located at the former Alert Area on the flightline. Once treatment of the soil is complete (i.e. meets NYSDEC TAGM HWR-94-4046), the soil will be used as fill material within the former base boundaries.

Excavation and *ex situ* treatment (i.e. landfarming or thermal desorption) of the soil is recommended over *in situ* treatment (i.e. bioventing or soil vapor extraction) at Spill Site SS-010. This recommendation is based on lack of an adequate vadose zone due to the shallow depth to groundwater table (i.e. approximately two feet below the ground surface). Such a thin vadose zone severely restricts the efficacy of potential *in situ* treatment options.

This document is presented in the format provided by the USEPA Action Memorandum Guidance Document, dated December, 1990.

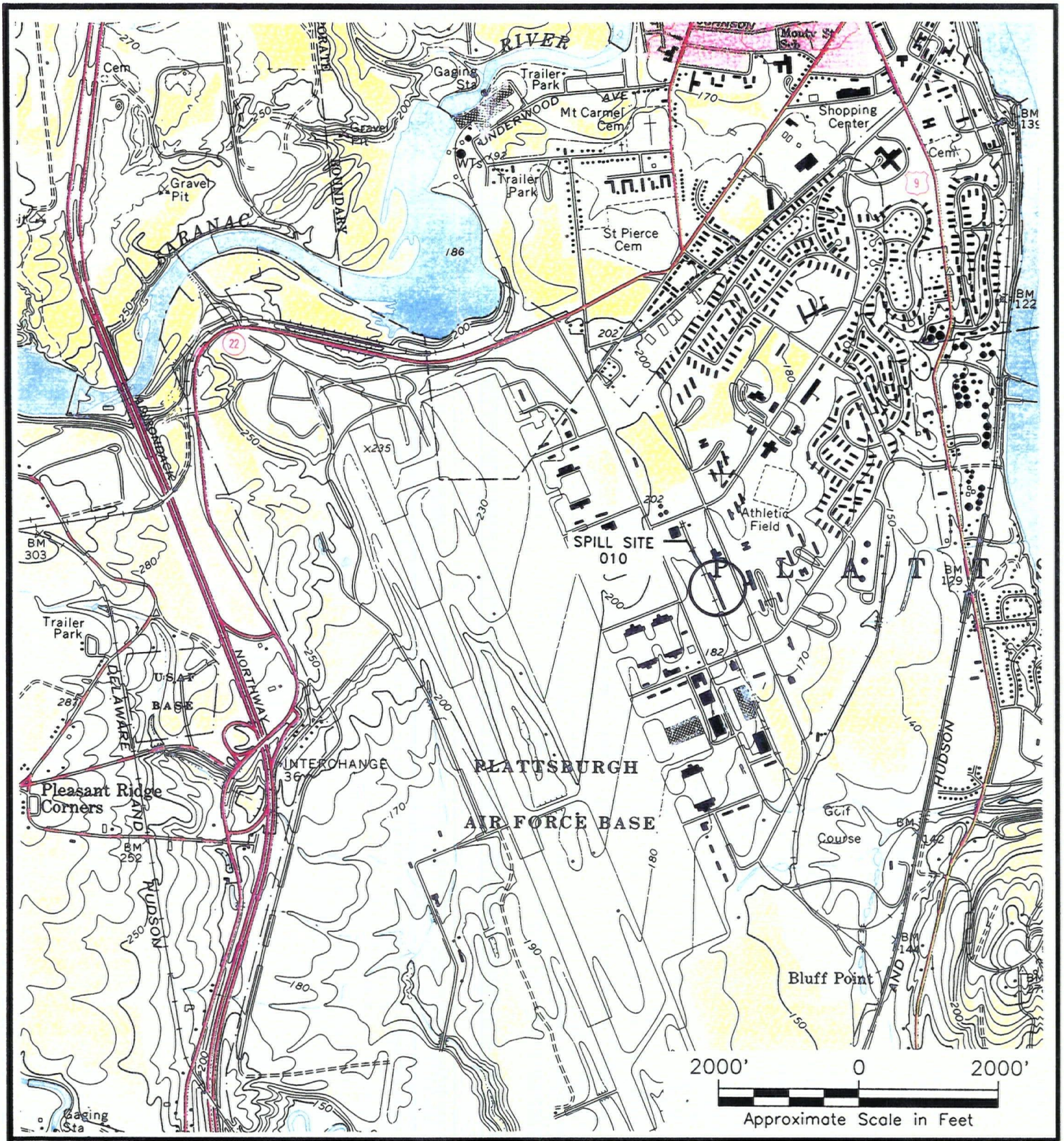
1.2 SITE HISTORY

Spill Site SS-010 was previously used by the 380th Transportation Squadron to service and maintain fuel tanker trucks and bowsers. A site plan of Spill Site SS-010 is presented in Figure 1-2. A waste accumulation/storage area was located northwest of Building 2540. Oils and fluids used in vehicle maintenance were routinely stored in

this area. Tanker trucks were routinely staged between Buildings 2540 and 2542. Personnel interviews conducted by Radian in 1985 described fuel spills that occurred as the tanker trucks were drained of residual fuel prior to maintenance. Quantities of spilled fuels are unknown. One test pit and three soil borings were sampled as part of a site investigation in 1987 (Jordan, 1987). Shallow soils in the waste accumulation area were found to contain petroleum and chlorinated hydrocarbons.

A remedial investigation (RI) was conducted by URS Consultants, Inc. from July 1993 through January 1994 (URS, 1994). The analytical results from the surface and subsurface soil samples collected during the RI indicate that near-surface soils at the SS-010 site are contaminated with VOCs, primarily xylenes, and SVOCs. Pesticides and polychlorinated biphenyls (PCBs) were detected in the soil samples, but at concentrations below "to be considered" (TBC) values (NYSDEC TAGM HWR-94-4046, Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994). In addition, nine metals were detected in the surface soil samples at concentrations exceeding TBCs.

A Delineation Investigation was conducted by OHM Remediation Services Corp., (OHM) and Parsons Engineering Science Inc., (Parsons ES) in June and July 1996. This investigation included a soil gas survey followed by the collection of soil samples. The results of the 1996 delineation investigation were consistent with the RI. The primary contaminants detected during the delineation investigation included ethylbenzene, xylenes, polycyclic aromatic hydrocarbons (PAHs), and isolated areas containing low levels (i.e. less than 10 mg/kg) of TCE. The likely source of TCE contamination is from vehicle paint and other compounds used to perform body work on base vehicles.



NEW YORK
QUADRANGLE LOCATION

LONGITUDE: N44° 38' 49"
LATITUDE: W73° 27' 17"

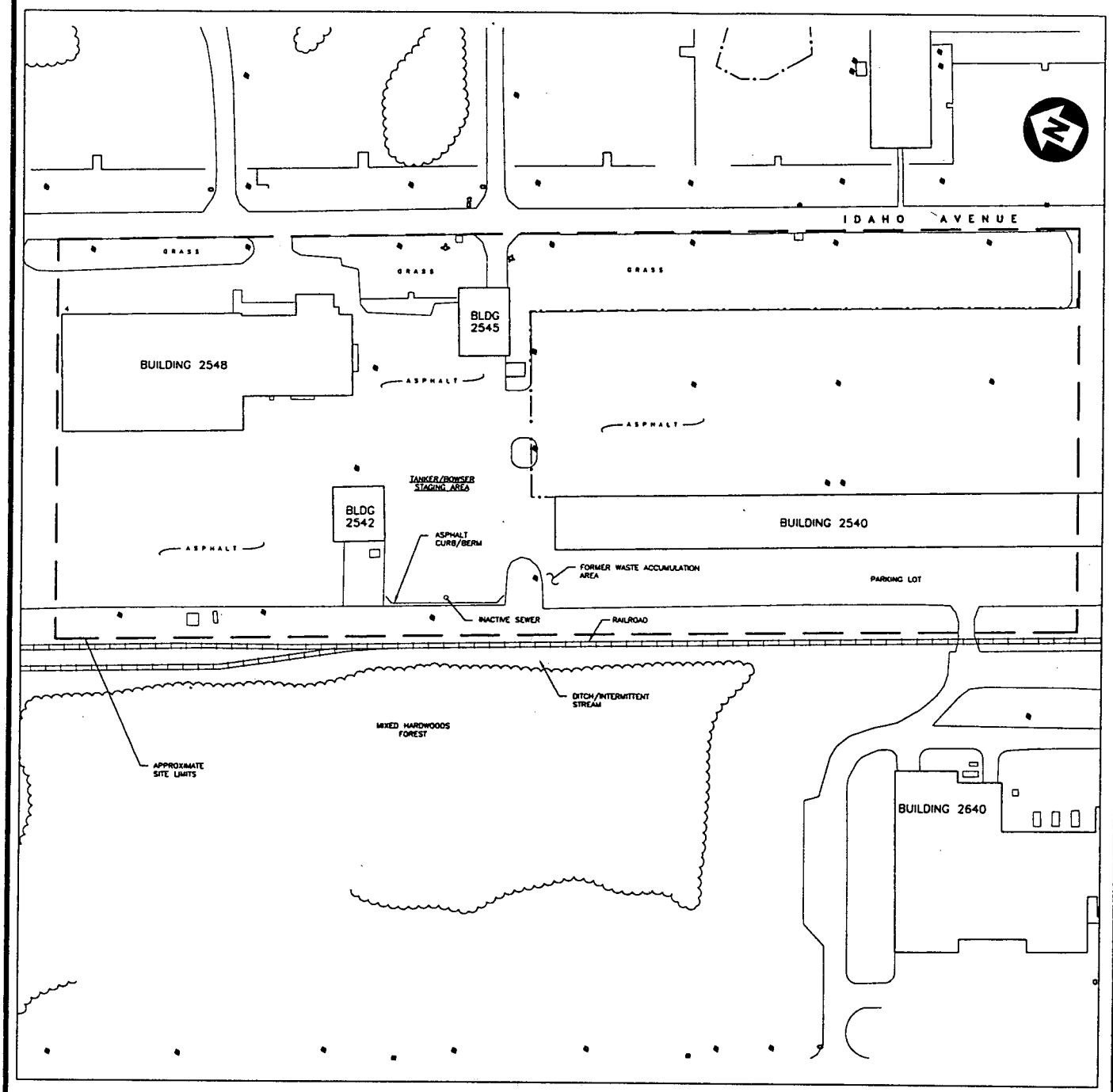
N

FIGURE 1.1

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SITE LOCATION MAP

PARSONS ENGINEERING SCIENCE, INC.



150' 75' 0 150'

Approximate Scale in Feet

SOURCE: URS CONSULTANTS, INC.

DATE: 09/12/96 (SEH)
Xref: SS010BSX.DWG
H:\CAD\727307\SS-010\FIG1-2.DWG (PS= 1/150XP PLOT= LASERBW)

FIGURE 1-2

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
SITE MAP

PARSONS ENGINEERING SCIENCE, INC.
DESIGN • RESEARCH • PLANNING
290 ELWOOD DAVIS ROAD • SUITE 312 • LIVERPOOL, N.Y. 13088 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

SECTION 2

PURPOSE

PAFB is undertaking a "time critical" Removal Action at Spill Site SS-010 located at PAFB in Plattsburgh, New York, pursuant to a Federal Facilities Agreement (FFA) dated 12 September 1991. This is being undertaken as a component of the Department of Defense (DOD) Installation Restoration Program (IRP) and as a component of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980 as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA).

The purpose of this Action Memorandum is to document the proposed removal action described herein for the Heavy Equipment Maintenance Facility designated as Spill Site SS-010 at PAFB.

SECTION 3

SITE CONDITIONS AND BACKGROUND

3.1 SITE DESCRIPTION

3.1.1 Physical Location

PAFB is located in northeastern New York State, adjacent to Lake Champlain (Figure 3-1). It is approximately 26 miles south of the Canadian border and 167 miles north of Albany, New York. The base is bordered on the north by the City of Plattsburgh and on the east by Lake Champlain. The base covers 4,795 acres of which 3,365 acres are federally owned and controlled by the military, and 1,430 acres are registered as easement tracts. PAFB was officially closed by the Department of Defense on 30 September 1995, and responsibility for property reuse transferred to the Plattsburgh Airbase Redevelopment Corporation.

Spill Site SS-010 is located in the northern portion of the industrial area that previously supported flightline operations (Figure 3.2). The area of concern is generally the area contiguous to Buildings 2540 and 2542, east of the railroad tracks, and west of Idaho Avenue (Figure 3-3).

3.1.2 Removal Site Evaluation

The facilities in this area of the base were used by the 380th Transportation Squadron to maintain heavy equipment. Building 2540 was previously used to perform body work on base vehicles. Building 2542 was used to service base aircraft refueling tanker trucks and bowsers. These vehicles were routinely parked in the paved area between the buildings.

The 380th Transportation Squadron provided traffic management, vehicle operational services, and vehicle maintenance. Radian reported that waste materials were generated only by the vehicle maintenance branch (Radian, 1985). Materials used or generated included 10W-30 engine oil (3,900 gallons per year (gal/yr)), 30W engine oil (1,800 gal/yr), hydraulic oil (300 gal/yr), transmission fluid (300 gal/yr), PD680 (300 gal/yr), lacquer and enamel paint thinners (100 gal/yr), contaminated fuels (240 gal/yr), and battery acid (120 gal/yr). Battery acid was reportedly neutralized with baking soda and flushed down the sanitary sewer (Radian, 1985).

JP-4 aircraft refueling tanker trucks were serviced in Building 2542 and staged in the paved area between Buildings 2540 and 2542. Personnel interviews conducted during the Phase I records search described fuel spills that occurred as trucks were drained of residual JP-4 fuel prior to maintenance (Radian, 1985). Total quantities of fuel spilled in this area are not known.

3.1.3 Site Characteristics

3.1.3.1 Physical Features

The major surface features in the vicinity of Spill Site SS-010 include mostly unoccupied buildings, paved parking lots, peripheral lawn areas, ditches or drainage channels, and a stand of hardwood trees. Parking areas surround Buildings 2540, 2542, 2545, and 2546. Areas of mowed grass are adjacent to the Central Heating Plant (northwest) and along the railroad tracks to the west of Spill Site SS-010. Drainage ditches located on both sides of the railroad tracks and nearby storm sewers carry surface water runoff away from the site. The stand of hardwood trees is located to the west of the site. Figure 3-3 depicts the major site features.

The land surface at Spill Site SS-010 slopes to the southeast from approximately 200 feet above mean sea level (MSL) near the Central Heating Plant to approximately 180 feet above MSL in the southeastern portion of Spill Site SS-010. A small asphalt berm, approximately one foot high by 80 feet long, is located at the edge of the paved parking area adjacent to the former waste accumulation area. An approximately 40-foot wide strip of mowed lawn separates the edge of pavement to the southwest side of Building 2540 from a railroad spur. A waste accumulation/staging area was located near the northwest corner of Building 2540, but has since been paved over.

3.1.3.2 Site Stratigraphy

Stratigraphy in the area of Spill Site SS-010 consists of four generalized geologic units (Table 3-1). These units consist of two unconsolidated, stratified layers (i.e., sand and silt/clay), which overlie glacial till and bedrock. The depth, thickness, and descriptions of the unconsolidated deposits vary slightly across the SS-010 site. Each of these units is described below. Geologic cross sections are shown in Figures 3-4 through 3-6.

Sand and Gravel

This unit is characterized as generally fine to medium size sand with occasional interstratified layers of coarser sand, silt, and gravel. The sand unit typically becomes finer-grained with depth. The thickness of the sand unit was approximately 40 feet thick in the RI borings (Figures 3-4 through 3-6).

Silt and Clay

This unit is characterized as a gray, very stiff, layered silt and clay. The clay has a medium to high plasticity. Silt and clay content and plasticity generally increase with depth. The silt and clay unit was encountered between 32 and 35 feet below ground surface (bgs). The borings and monitoring wells installed at Spill Site SS-010 did not penetrate this layer; however, based on previous investigations at PAFB, its thickness was estimated to range from 2 to 27 feet in the vicinity of Spill Site SS-010 (Figures 3-4 through 3-6).

Glacial Till

The glacial till consists of two major types: sandy till and clayey till. Both units consist of poorly sorted sand, silt, clay, gravel and boulder material. This layer is considered a leaky confining unit due to the presence of fractures and joints. The

glacial till was not encountered during the Spill Site SS-010 RI because no borings were advanced to the till layer. However, glacial till was encountered in all of the basewide bedrock wells and piezometer borings (Malcolm Pirnie, Inc., 1993). One of these borings, PZ-11D, is located near the SS-010 site (approximately 1,200 feet southeast). Boring data from PZ-11D was used to infer a till depth of approximately 45 feet bgs at the SS-010 site (Figures 3-4 through 3-6).

Bedrock

The underlying bedrock consists of thin- to thick-bedded limestone and dolostones with interbedded layers of sandstone and shale. The depth to bedrock at Spill Site SS-010 is estimated to be 60 feet bgs (Figures 3-4 through 3-6). This depth was estimated from deep wells and geophysical surveys conducted during the Base-Wide Hydrogeology Investigation (MPI 1993), and during the FT-002 RI (ABB Environmental 1993).

3.1.3.3 Hydrogeology

The regional hydrogeology in the Plattsburgh area is dominated by infiltration and runoff from the Adirondack Mountains to the west. The regional discharge is to Lake Champlain to the East.

Three distinct hydrogeologic units were found in the SS-010 study area: (1) a water table aquifer present in the sand unit; (2) a series of semiconfining and confining layers consisting of silts, clays (silt and clay unit), and glacial till; and (3) a confined aquifer within the carbonate bedrock (Giese and Hobba, 1970). The average depth to groundwater in the sand unit, based on six rounds of water level measurement, ranged from 2 to 4 feet below ground surface (bgs). The direction of local groundwater flow is to the southeast at a horizontal gradient of approximately 0.014 feet per foot.

3.1.4 Release or Threatened Release of a Hazardous Substance, Pollutant or Contaminant

The primary source of contamination at Spill Site SS-010 is due to JP-4 fuel spills that reportedly occurred as aircraft refueling tanker trucks were drained of residual fuel prior to maintenance. This source of contamination may threaten the local groundwater at the site if it is not remediated.

3.1.4.1 Previous Sampling Results

The primary source of information presented in this section was taken from the Remedial Investigation Draft Report for the Heavy Equipment Maintenance Facility (SS-010) prepared by URS Consultants, Inc., (July 1994).

3.1.4.1.1 Surface Soils

Nine surface soil samples were collected as part of the RI (URS, 1994). Two samples were collected from a background location, four samples were collected from immediately beneath the pavement sub-base surrounding Buildings 2540 and 2542, and three samples were taken from the surrounding grassy areas. The sample locations and results are displayed on Figure 3-7.

Background Sampling Results

No VOCs were detected in the background samples collected at Spill Site SS-010, and the SVOC detections were rejected during the data validation process. One background sample was analyzed for pesticides and PCBs. The pesticides detected in this sample were 4,4-DDE (dichloro-diphenyl-trichloroethene, 4,4-DDT (dichloro-diphenyl-trichloroethane), endosulfan II, and endrin aldehyde at concentrations at least one order of magnitude below their respective TBC values. In addition, 20 of the 23 Target Analyte List (TAL) metals were detected in the background samples. The analytical results for the background sample are presented in Table 3-2.

Pavement Sub-base Sampling Results

A total of 15 SVOCs were detected in the 4 sub-base samples collected in this area. Total SVOC concentrations ranged from 1,074 μg/kg to 5,846 μg/kg and were a result of the presence of polycyclic aromatic hydrocarbons (PAHs). SVOCs were detected most frequently in sample SS10-07, which was collected adjacent to the former waste accumulation area. The analytical results from the sub-base soil samples are presented in Table 3-3.

Only one VOC, xylene, was detected in the sub-base samples collected in this area. Xylenes were detected in sample SS10-02 at a concentration of 14,000 μg/kg. No VOCs were detected in the other samples collected. Three of the four samples were analyzed for pesticides and PCBs. Pesticides were detected in only one sample at a total concentration of 20 μg/kg. PCB Aroclor-1254 was detected in one sample at 140 μg/kg and PCB Aroclor-1260 was detected in two samples at 27 and 170 μg/kg. Nineteen of the 23 TAL metals were also detected in the 4 samples. Metals which were detected above two times the maximum background concentrations were barium (117 mg/kg), calcium (between 62,200 and 203,000 mg/kg), lead (203 mg/kg), sodium (211 mg/kg), magnesium (9,860 mg/kg), and manganese (221 mg/kg).

Grassy Area Sampling Results

Seventeen SVOCs were detected in the 3 samples collected from the grassy areas. The SVOCs included 15 PAHs and 2 phthalates at concentrations ranging from 63 to 2,470 μg/kg. In general, PAHs were detected more frequently and at higher concentrations in sample SS10-01 than in other samples collected from the site. Sample SS10-01 was taken near the former waste accumulation area and near the reported spill area. The analytical results for samples collected from the unpaved area at site SS-010 are presented in Table 3-4

No VOCs were detected in these samples. One sample was analyzed for pesticides and PCBs but none were detected. Nineteen of the 23 TAL metals were detected in the 3 samples from the grassy area. The metals detected at concentrations exceeding 2 times the background levels were: cadmium (3.0 mg/kg), cobalt (5.6 mg/kg), lead (252 mg/kg), sodium (143 mg/kg), and zinc (129 mg/kg). Cyanide was detected in 2 samples at concentrations of 0.87 to 1.0 mg/kg.

3.1.4.1.2 Subsurface Soil

Sixteen subsurface soil samples were collected from 3 soil borings and 2 monitoring well borings as part of the RI (URS, 1993). Boring locations and results are shown in Figure 3-8. Two background samples were collected within the mixed

hardwood stand west of the site. Nine samples were taken beneath paved areas beginning at the bottom of the pavement sub-base; and two samples were taken at a boring located in a grassy area at the edge of pavement. In addition, three subsurface samples were collected from a test pit excavated in the vicinity of the former waste accumulation area (Jordan, 1989)

Background Sampling Results

No organic compounds were detected in the background samples at Spill Site SS-010. However, 12 of the 23 TAL metals were detected in these samples. The analytical results for the background subsurface soil samples are presented in Table 3-5.

Pavement Sub-base Sampling Results

Seven VOCs were detected in the subsurface soil samples taken from beneath the pavement. Total VOC concentrations ranged from 92 μg/kg to 46,500 μg/kg. The VOCs detected included solvents (such as 2-butanone, acetone, carbon disulfide, and 1,2-dichloroethene) and benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds. The highest BTEX concentrations were detected in boring SB10-03, which was located in the area where fuel browsers were reportedly drained of residual JP-4 fuel. The analytical results for the subsurface soil samples collected from beneath paved areas at site SS-010 are presented in Table 3-6.

A total of ten SVOCs were detected in 7 of the 9 samples collected from beneath the pavement. Total SVOC concentrations ranged from 640 μg/kg to 51,000 μg/kg. All SVOCs detected were PAHs, except for dibenzofuran. Two of these 7 samples contained PAHs at concentrations greater than 10,000 μg/kg.

Only two samples (SB10-01 and SB10-03) were analyzed for pesticides. Endosulfan sulfate and endosulfan II, were detected in both these samples at concentrations ranging from 1.7 μg/kg (endosulfan sulfate) to 9.6 μg/kg (endosulfan II). PCB Aroclor-1260 was detected in one sample (SB10-01) at 21 μg/kg. Two samples were analyzed for TAL metals. Fifteen metals were detected in these samples but none exceeded two times the maximum background metals concentrations.

Grassy Area Sampling Results

Only one of the two samples collected from the grassy area contained VOCs. Sample SB10-02 was collected from the 0- to 2-foot interval in the vicinity of the former waste accumulation area and contained a total VOC concentration of 2,480 μg/kg. Detected VOCs included 2-butanone (120 μg/kg), ethylbenzene (460 μg/kg), and xylenes (1,900 μg/kg). The analytical results for subsurface soil samples collected from unpaved areas at site SS-010 are presented in Table 3-7.

Seventeen SVOCs were detected in the 2 samples collected from this boring. All SVOCs were PAHs, except for 4 phthalates which were detected at 53 and 170 μg/kg in the 0- to 2-foot and 2- to 4-foot intervals, respectively. Total SVOC concentrations were 9,300 μg/kg in the 0- to 2-foot interval and 105 μg/kg in the 2- to 4-foot interval.

Detected pesticides in the 0- to 2-foot interval included 4,4-DDE, 4,4-DDD, endosulfan sulfate, 4,4-DDT, methoxychlor, and endrin aldehyde at concentrations ranging from 0.87 to 8.7 μg/kg. The two PCBs detected in these samples were

Aroclor-1254 (26 μg/kg) and Aroclor-1260 (42 μg/kg). Lead was the only TAL metal detected at a level that exceeded two times the maximum detected background concentration. In addition, one sample was analyzed for TCLP parameters and RCRA characteristics. Results indicated that the samples were not hazardous as defined under 40 CFR 261.

Test Pit Sampling Results

As part of the Site Investigation (SI), three subsurface samples were collected from a test pit excavated in the vicinity of the former waste accumulation area (Jordan, 1989). These samples were collected at depths of 2-, 3-, and 7-feet below the ground surface (bgs). Six VOCs (chloroform, methylene chloride, acetone, tetrachloroethene, 4-methyl-2-pentanone, and 1,2-dichloroethene) were detected at concentrations up to 89 μg/kg. The highest total VOC concentration was 112 μg/kg in the 3-foot depth sample. Lead was detected in all samples at concentrations ranging from 1.8 to 116 mg/kg. Total petroleum hydrocarbons (TPH) were detected at 8,300 mg/kg in the 2-foot depth sample and 99 mg/kg in the 7-foot depth sample.

Delineation Investigation

A delineation investigation was performed by OHM and Parsons ES in June and July 1996. Eighty soil gas screening samples were collected from the area surrounding site SS-010 for analysis of VOCs by a field gas chromatograph (GC). Based on the results of the soil gas samples, 32 soil samples were collected via a Geoprobe® unit for analysis of VOCs (EPA Method 8020) and SVOCs (EPA Method 8270). The soil gas survey results for selected analytical parameters are presented on Figure 3-9, and the full analytical results are presented in Table 3-8. The soil sample results for selected analytical parameters are shown on Figure 3-10, and all NYSDEC TAGM #4046 exceedances are presented in Table 3-9.

During the delineation investigation, 80 soil gas screening samples were analyzed using a portable on-site GC for BTEX compounds, TCE, and tetrachloroethene (PCE). Positive detections were noted in 35 of the 80 samples analyzed. Total VOC concentrations ranged from a low of 27 parts per billion (ppb) to a high of 1,361,025 ppb in these 35 samples. The highest total VOC concentration was identified in sample A-10 which was located adjacent to the former waste storage area. Samples C-8 and D-13 also contained total VOCs in excess of 1,000,000 ppb. In addition, total VOC concentrations in samples C-11, C-12, D-15, and D-16 were greater than 18,000 ppb.

BTEX compounds were identified in all 35 samples that had positive detections. Concentrations ranged from a low of 27 ppb to a high of 1,006,025 ppb. The highest BTEX concentration was found in sample C-8. High BTEX concentrations were also noted in samples D-13 (860,850 ppb) A-10 (681,555 ppb), and C-11 (131,238 ppb).

TCE was identified in 9 of the 80 samples analyzed. TCE concentrations ranged from 132 ppb to 780,000 ppb. The highest TCE concentration was identified in sample A-10. TCE was also detected at high concentrations is samples C-8 (355,000 ppb) and D-13 (213,000 ppb). PCE was detected in only five of the 80 samples. PCE concentrations ranged from 137 ppb to a high of 29,350 ppb in sample A-10.

The analytical results for the soil samples indicate localized soil contamination in three general areas of the site. The two smaller areas are located directly east of building 2540 where vehicles were reportedly parked before and after receiving maintenance. The soil in these areas was found to contain relatively low levels (i.e. less than 5 mg/kg) of various fuel and lubricating oil residual VOCs and SVOCs. The source of these contaminants is likely the result of leaks from parked vehicles. The area near soil sample locations 10-SS-09 and 10-SS-11 (Figure 3-9) has soils containing xylenes at 0.56 μg/kg, and the PAH dibenzo(a,h)anthracene at a level of 0.075 μg/kg. The area near sample location 10-SS-07 had soils containing various PAHs including benzo(a)anthracene (4,050 μg/kg), benzo(a)pyrene (3,650 μg/kg), and chrysene (4,230 μg/kg).

The third general area of contaminated soil was found to lie between buildings 2542 and 2540 (Figure 3-10). Some soils containing low levels of TCE (i.e. less than 10 mg/kg) were detected in this area. Other soil contaminants detected were fuel-related residuals including xylenes (5,520 μg/kg), ethylbenzene (33,300 μg/kg), and total VOCs (from 26,300 μg/kg to 138,400 μg/kg).

3.1.4.1.3 Groundwater

The groundwater investigation performed as part of the RI (URS, 1993) was undertaken in two phases. In the first phase, groundwater samples were collected from soil borings advanced at the site and screened for VOCs and SVOCs. The samples were collected via Hydropunch drilling methods at 6 locations, 3 soil boring locations and 3 planned monitoring well locations. In the second phase, two rounds of groundwater samples were collected from 3 newly installed groundwater monitoring wells.

Screening Sampling Results

During groundwater screening, a total of 13 samples were collected and analyzed for VOCs and SVOCs. Sample locations and results are shown on Figure 3-11. A total of seven VOCs were detected in the groundwater screening samples. Total VOC concentrations ranged from 2 μg/kg to 1,022 μg/kg. Xylenes and ethylbenzene were detected most frequently and at the highest concentrations (see Figure 3-11). Other VOCs detected included acetone, carbon disulfide, 2-butanone, benzene, and TCE. Ten SVOCs were also detected in the screening samples. Total SVOC concentrations ranged from 1 μg/kg to 91 μg/kg. SVOC detections were primarily PAH and phthalate compounds. One phenolic compound, 2,4-dimethylphenol, was detected at two locations, HP10-02-5 and MWHP10-03-5, at concentrations of 3 μg/kg and 7 μg/kg, respectively. The most frequently detected SVOCs were naphthalene and 2-methylnaphthalene (Figure 3-11).

Monitoring Well Sampling Results

Two rounds of groundwater samples were collected from the three monitoring wells: MW-10-001 (located approximately 100 feet upgradient of the suspected spill area), and MW-10-002 and MW-10-003 (located approximately 200 feet downgradient from MW-10-001 and near the former waste accumulation pad, respectively). Samples were analyzed for TAL metals and the Target Compound List (TCL) organics identified in the USEPA Contract Laboratory Protocol Statement of Work for Organic

Analysis, Document Number OLM01.8. Both filtered and unfiltered metals samples were collected. The volatile fractions of each sample collected during the second-round sampling event were analyzed by USEPA Method 524.2. Sample locations and results are shown in Figures 3-12 and 3-13.

During the first-round sampling, three VOCs were detected in MW-10-003 at a total concentration of 14 μg/kg. No VOCs were detected in MW-10-001 or MW-10-002. No SVOCs, pesticides, or PCBs were detected in the first-round samples. Eighteen of 23 TAL metals were detected in MW-10-001. Seventeen of the 23 TAL metals were detected in the unfiltered sample from MW-10-002 and 12 were detected in the unfiltered sample from MW-10-003.

During the second-round sampling, 3 organic compounds, including 2 VOCs (chloromethane and 1,2-dichloroethane) and one SVOC (butylbenzylphthalate), were detected in MW-10-001 at low concentrations (i.e. less than 20 μg/l). A total of 7 VOCs were detected in the two downgradient monitoring wells (MW-10-002 and MW-10-003). Total VOC concentrations ranged from 5.7 μg/kg to 78 μg/kg. Detected VOCs included chlorinated hydrocarbons (methylene chloride, chloromethane, chloroethane, and 1,2-dichloroethane), BTEX compounds (benzene and xylene), and acetone. The two SVOCs detected were naphthalene at 1 μg/kg, and bis(2-ethylhexyl)phthalate at 2 μg/kg. The reason that most of the VOCs detected during the second-round sampling event were not detected in the first-round sampling event likely due to the lower detection limits of an alternate laboratory method (i.e. Method 524.2) used during the second-round sampling event.

During the second round of sampling, no pesticides or PCBs were detected in the 3 samples. Concentrations of metals detected were similar to those detected during the first-round. Sixteen metals and cyanide were detected in the unfiltered sample from MW-10-002 and 9 metals were detected in the unfiltered sample from MW-10-003. In general, metals were detected less frequently and at lower concentrations in the filtered samples than in the unfiltered samples.

3.1.4.2 Current Status

The principle source of contamination (i.e., fluids and oils associated with maintenance of vehicles) has been permanently removed from the site. In addition, this area will no longer be used for vehicle maintenance and repair due to the closed status of the base. The main concern at this site is the secondary source of contamination, i.e. the contaminated soil above the groundwater. Based on the available information, elevated levels of organic contaminants have been detected in the groundwater. The proposed interim removal action should be implemented to protect the groundwater from further contamination.

3.1.5 NPL Status

PAFB is listed on the National Priority List (NPL) as of November 1989. Multiple locations within the base are of concern, including Spill Site SS-010. An SI and a RI have been conducted on the area adjacent to Buildings 2540 and 2542 (Spill Site SS-010). The proposed remedial action addresses immediate environmental risks associated with previous spills at the site.

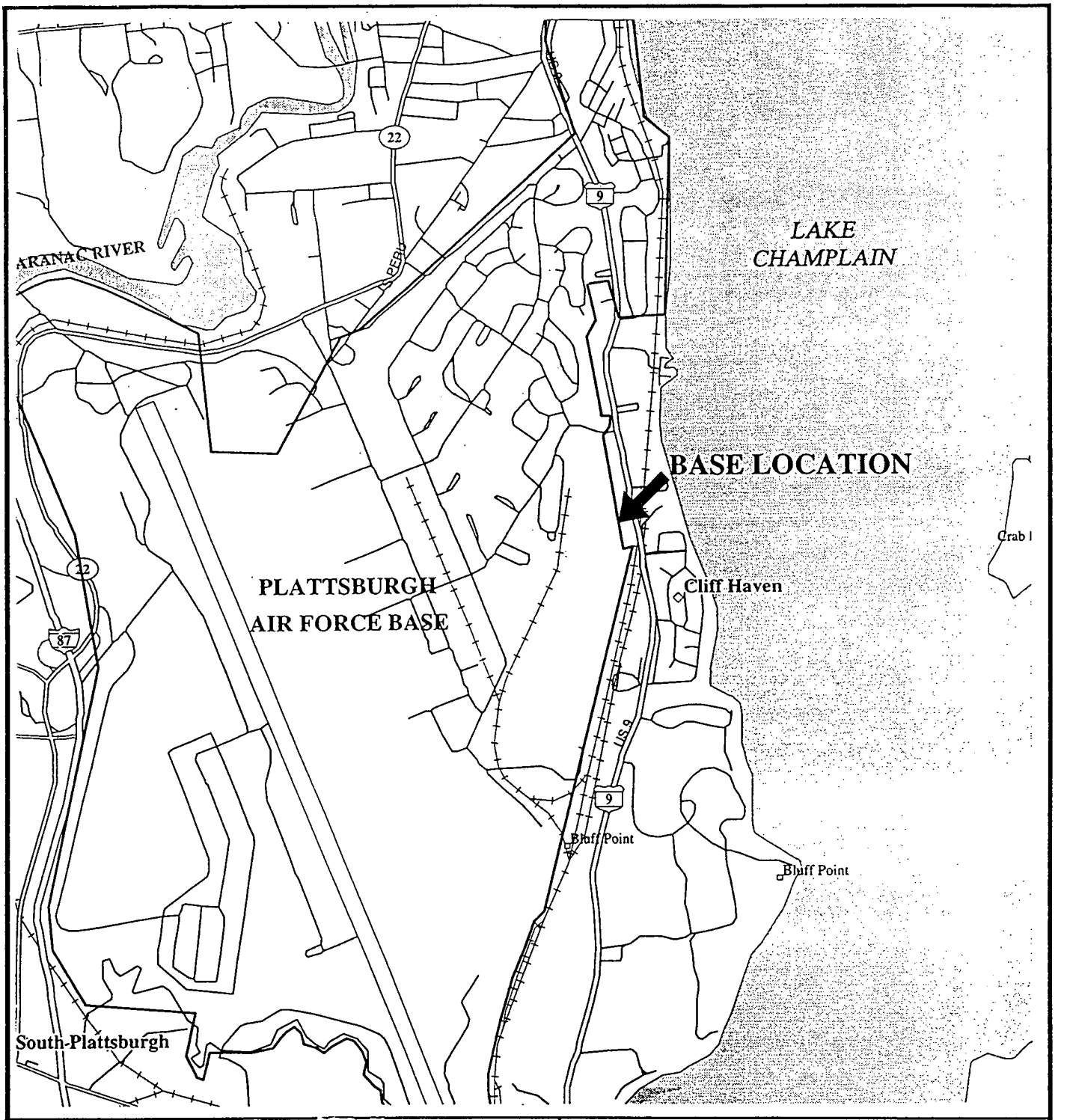
3.2 OTHER ACTIONS TO DATE

No previous remedial action has been conducted at Spill Site SS-010.

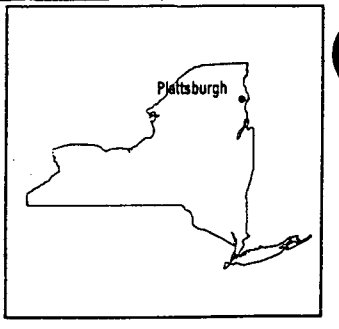
3.3 FEDERAL, STATE, AND LOCAL ACTION TO DATE

The NYSDEC first recognized that contamination was present at Spill Site SS-010 after identification of the site by Radian Inc., during the Phase I Records Search, April 1985.

The U.S. Air Force informed the USEPA and the NYSDEC during the 22 August 1996 BRAC Cleanup Team (BCT) Meeting of their intention to perform a source control removal action at Spill Site SS-010. Receipt of this Action Memorandum starts the clock for this time critical removal action.



LATITUDE: N44°39'49"
LONGITUDE: W73°27'45"



NEW YORK
QUADRANGLE LOCATION

Scale 1:31,250 (at center)

2000 Feet

1000 Meters

DATE: 10/10/95 (SEH)
727307.06100\BOARD.DWG

FIGURE 3-1

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

BASE LOCATION MAP

PARSONS ENGINEERING SCIENCE, INC.
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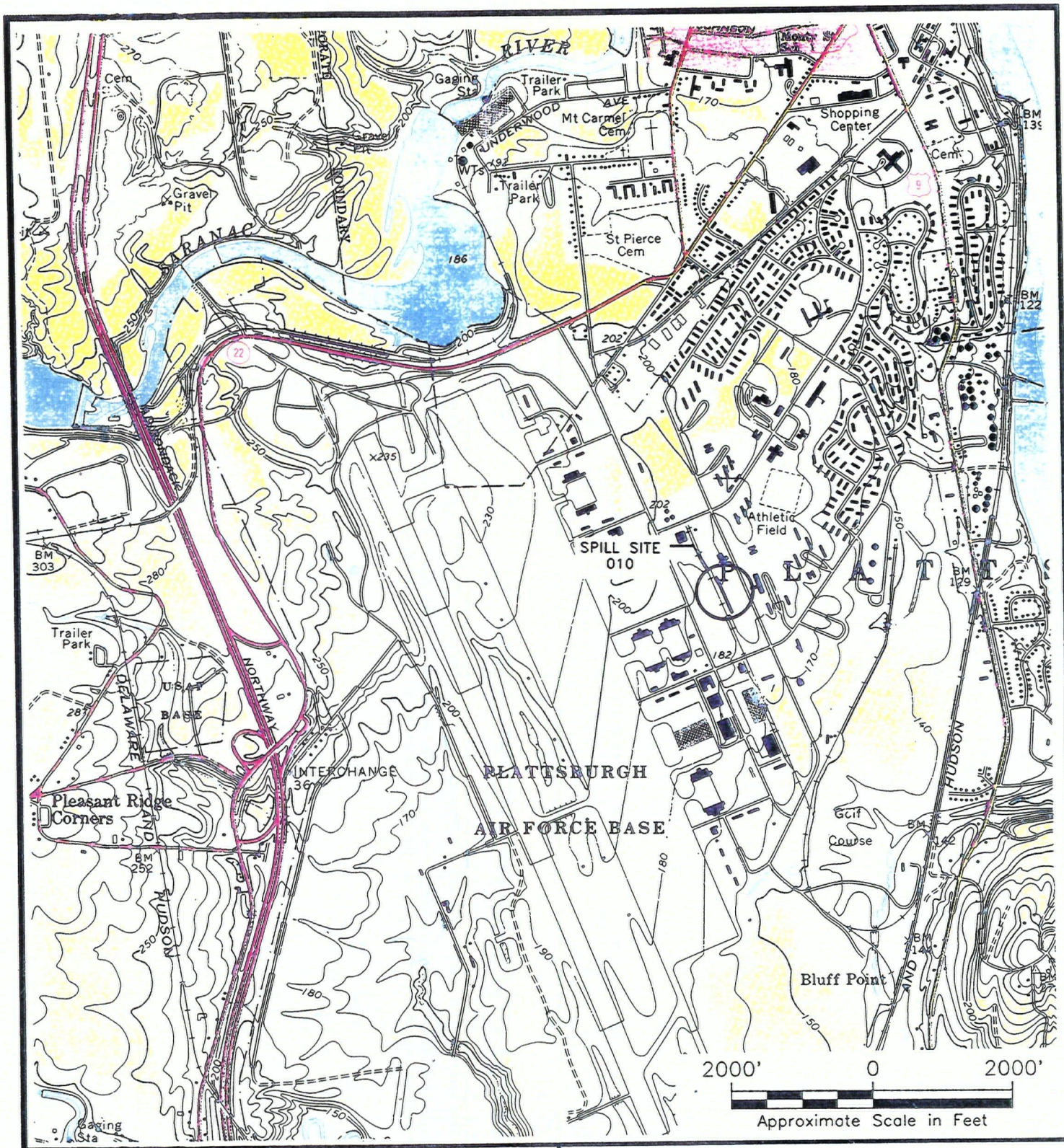


NEW YORK
QUADRANGLE LOCATION

LONGITUDE: N44° 38' 49"
LATITUDE: W73° 27' 17"

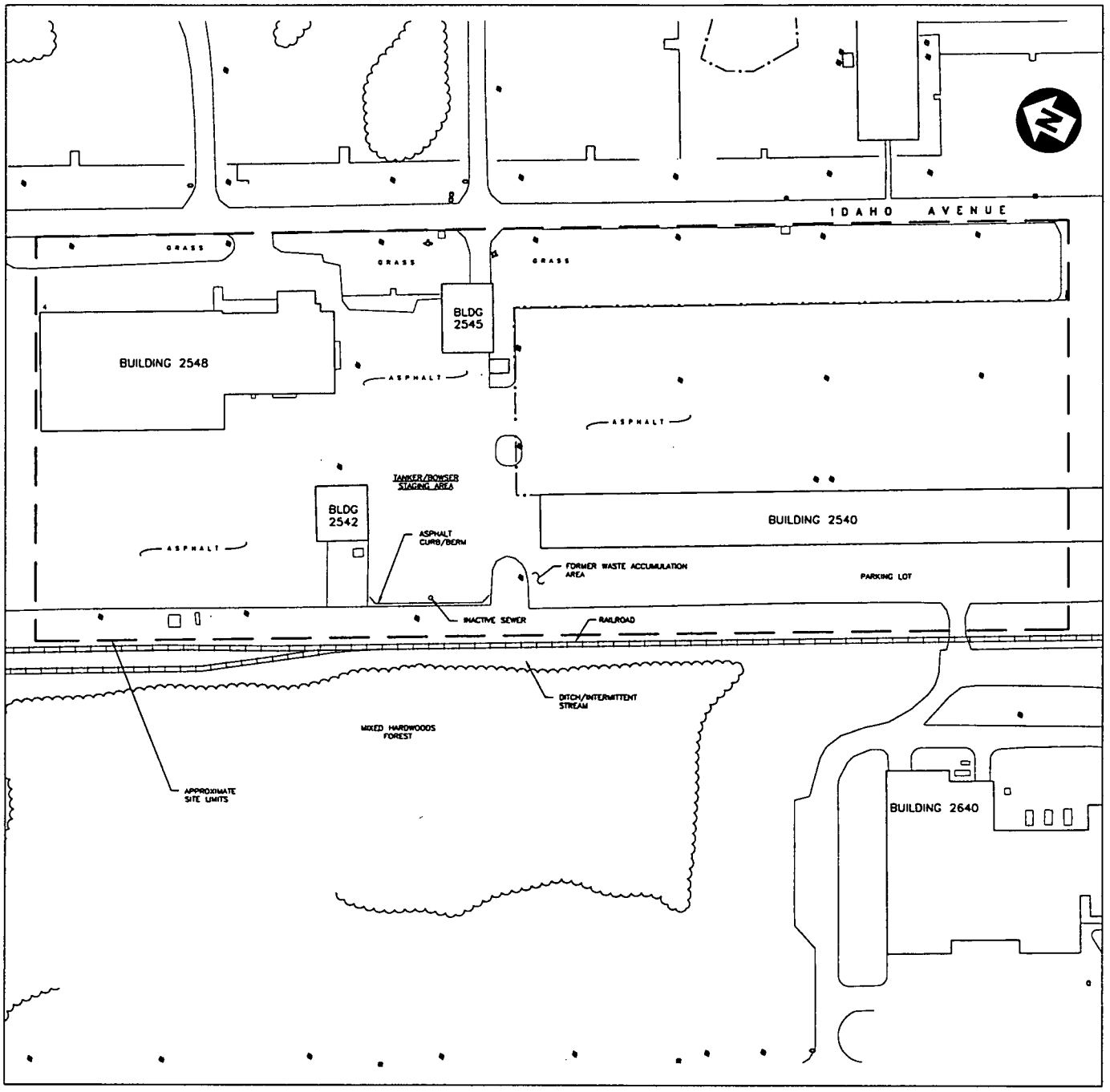
N

FIGURE 3.2

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SITE LOCATION MAP

PARSONS ENGINEERING SCIENCE, INC.



150' 75' 0 150'

Approximate Scale in Feet

SOURCE: URS CONSULTANTS, INC.

DATE: 09/17/96 (SEH)
Xref: SS010BSX.DWG
H:\CAD\727307\SS-010\FIG3-3.DWG (PS= 1/150XP PLOT= LASERBW)

FIGURE 3-3

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
SITE MAP

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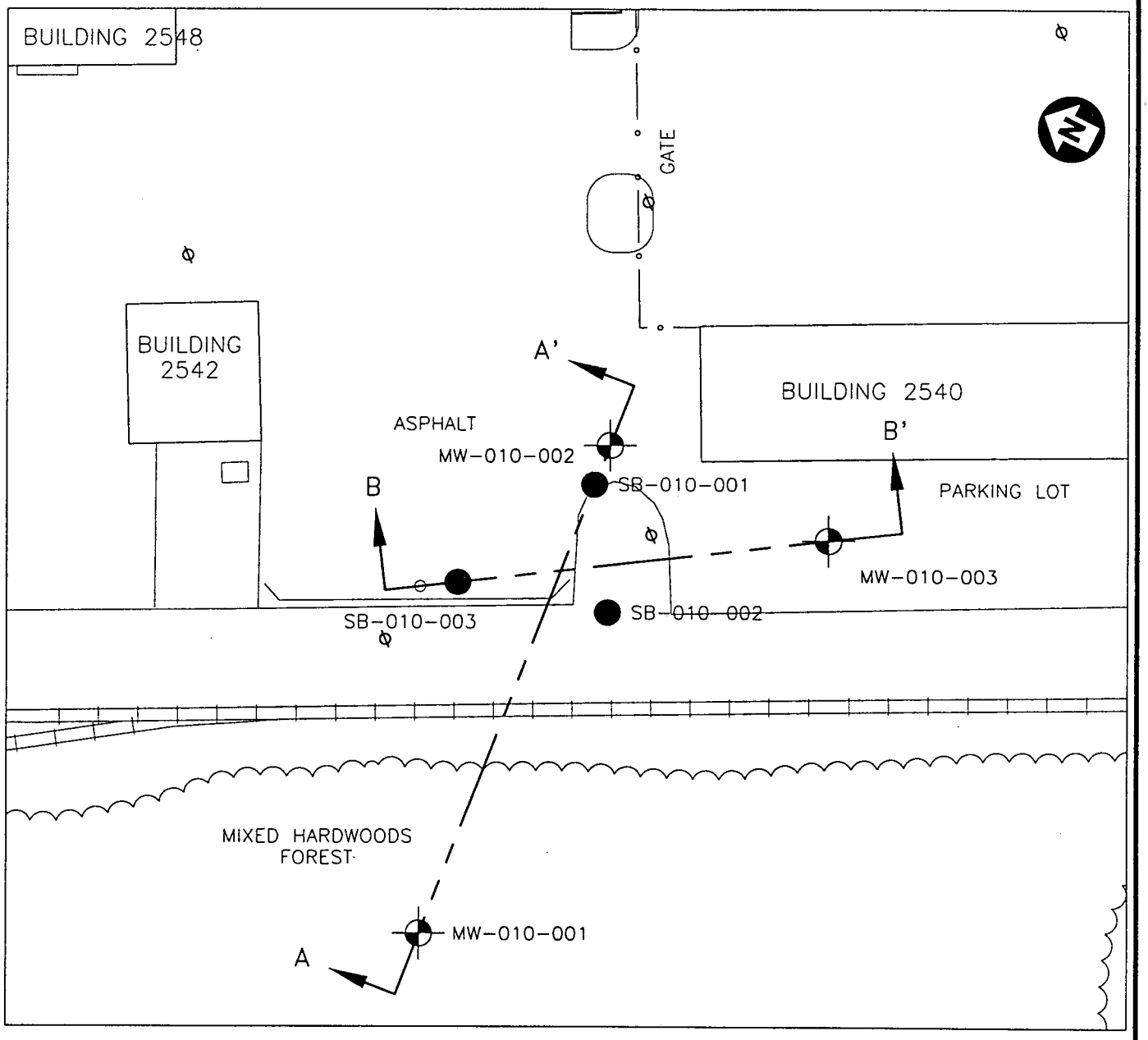

LEGEND:

MW-010-001 MONITORING WELL LOCATION

SB-010-001 SOIL BORING LOCATION

A A' CROSS SECTION LOCATION

60' 30' 0 60'

Approximate Scale in Feet

SOURCE: URS CONSULTANTS, INC.

DATE: 09/07/96 (SEH)
Xref: SS010BSX.DWG
I:\USERS\40919\SS-010\FIG3-4.DWG (PS= VARIES PLOT= LASERBW)

FIGURE 3-4

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
CROSS SECTION LOCATIONS

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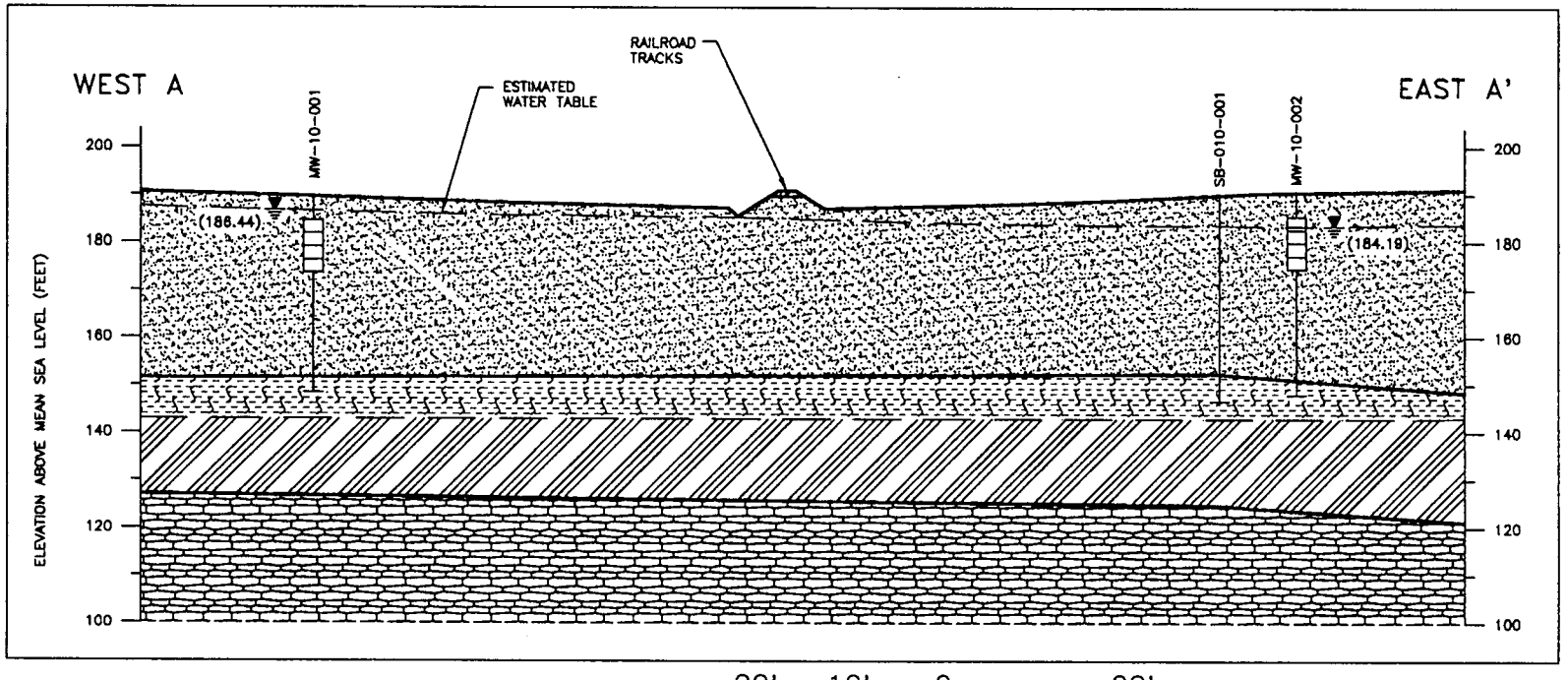
OFFICES IN PRINCIPAL CITIES

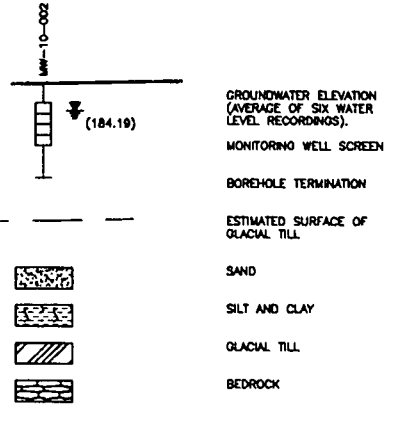


20' 10' 0 20'

Approximate Scale in Feet

VERTICAL SCALE EXAGGERATION= 2X

LEGEND:



NOTES:

1. GEOLOGICAL CONDITIONS SHOWN ARE REPRESENTATIVE OF THE CONDITIONS ENCOUNTERED AT EACH BORING LOCATION TO THE DEPTH DRILLED. EXPLORATIONS BETWEEN BORINGS HAVE BEEN INTERPRETED USING STANDARDLY ACCEPTED GEOLOGIC PRACTICES AND PRINCIPLES. ACTUAL CONDITIONS MAY VARY BETWEEN BORINGS FROM THOSE SHOWN.
2. ELEVATIONS BASED ON THE NORTH AMERICAN DATUM OF 1988.
3. GROUND SURFACE BASED ON 1990 U.S.G.S. TOPOGRAPHIC MAP.
4. GLACIAL TILL INFERRED FROM NEARBY PIEZOMETER PZ-11D. (MALCOLM PIRNIE, 1993).
5. BEDROCK SURFACE INFERRED FROM SEISMIC RESULTS . (MALCOLM PIRNIE, 1993).

DATE: XX/XX/XX
DATE: XX/XX/XX
H:\CAD\DIRECTOR\FILENAME.DWG (MODEL/PAPER SPACE)

SOURCE: URS CONSULTANTS, INC.

FIGURE 3-5

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
CROSS SECTION A-A'

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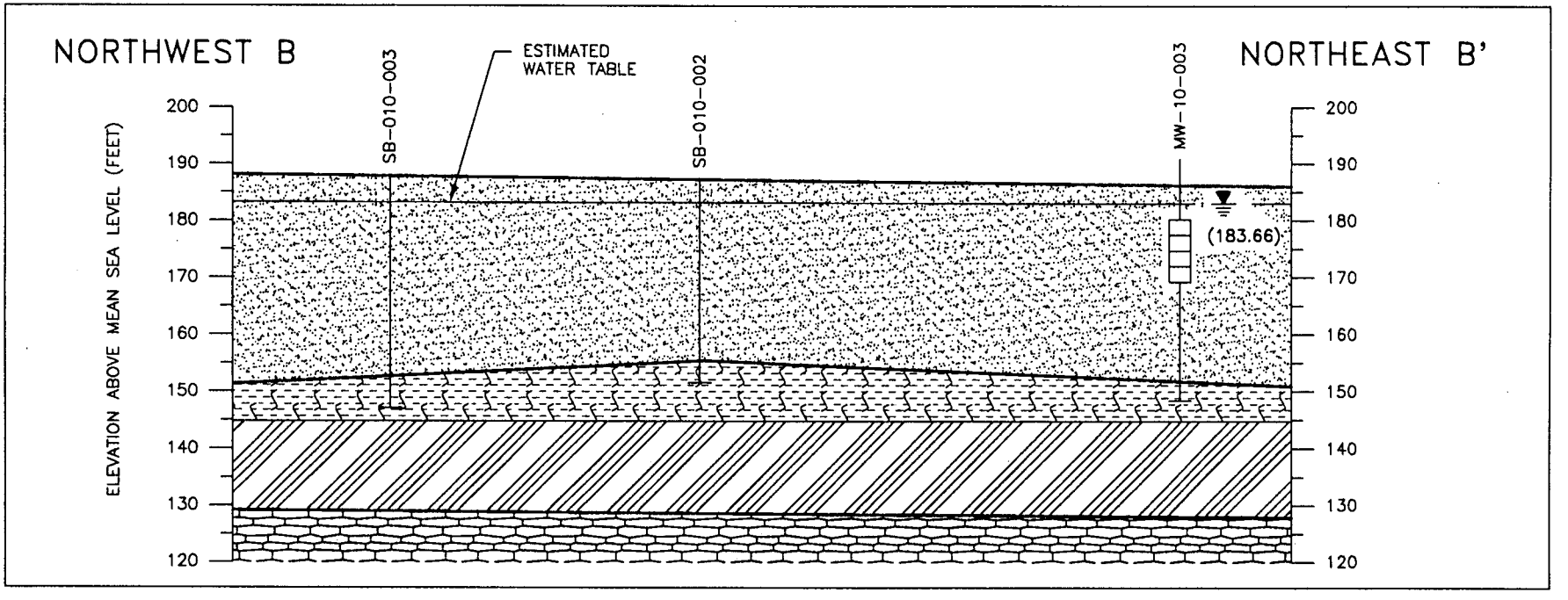
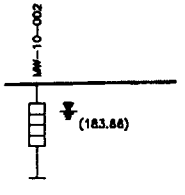


30' 15' 0 30'

Approximate Scale in Feet

LEGEND:



GROUNDWATER ELEVATION (AVERAGE OF SIX WATER LEVEL RECORDINGS).

MONITORING WELL SCREEN

BOREHOLE TERMINATION

ESTIMATED SURFACE OF GLACIAL TILL

SAND

SILT AND CLAY

GLACIAL TILL

BEDROCK

NOTES:

1. GEOLOGICAL CONDITIONS SHOWN ARE REPRESENTATIVE OF THE CONDITIONS ENCOUNTERED AT EACH BORING LOCATION TO THE DEPTH DRILLED. EXPLORATIONS BETWEEN BORINGS HAVE BEEN INTERPRETED USING STANDARDLY ACCEPTED GEOLOGIC PRACTICES AND PRINCIPLES. ACTUAL CONDITIONS MAY VARY BETWEEN BORINGS FROM THOSE SHOWN.

2. ELEVATIONS BASED ON THE NORTH AMERICAN DATUM OF 1988.

3. GROUND SURFACE BASED ON 1990 U.S.G.S. TOPOGRAPHIC MAP.

4. GLACIAL TILL INFERRED FROM NEARBY PIEZOMETER PZ-11D. (MALCOLM PIRNIE, 1993).

5. BEDROCK SURFACE INFERRED FROM SEISMIC RESULTS (MALCOLM PIRNIE, 1993).

DATE: XX/XX/XX
DATE: XX/XX/XX
H:\CAD\DIRECTOR\FILENAME.DWG (MODEL/PAPER SPACE)

SOURCE: URS CONSULTANTS, INC.

FIGURE 3-6

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
CROSS SECTION B-B'

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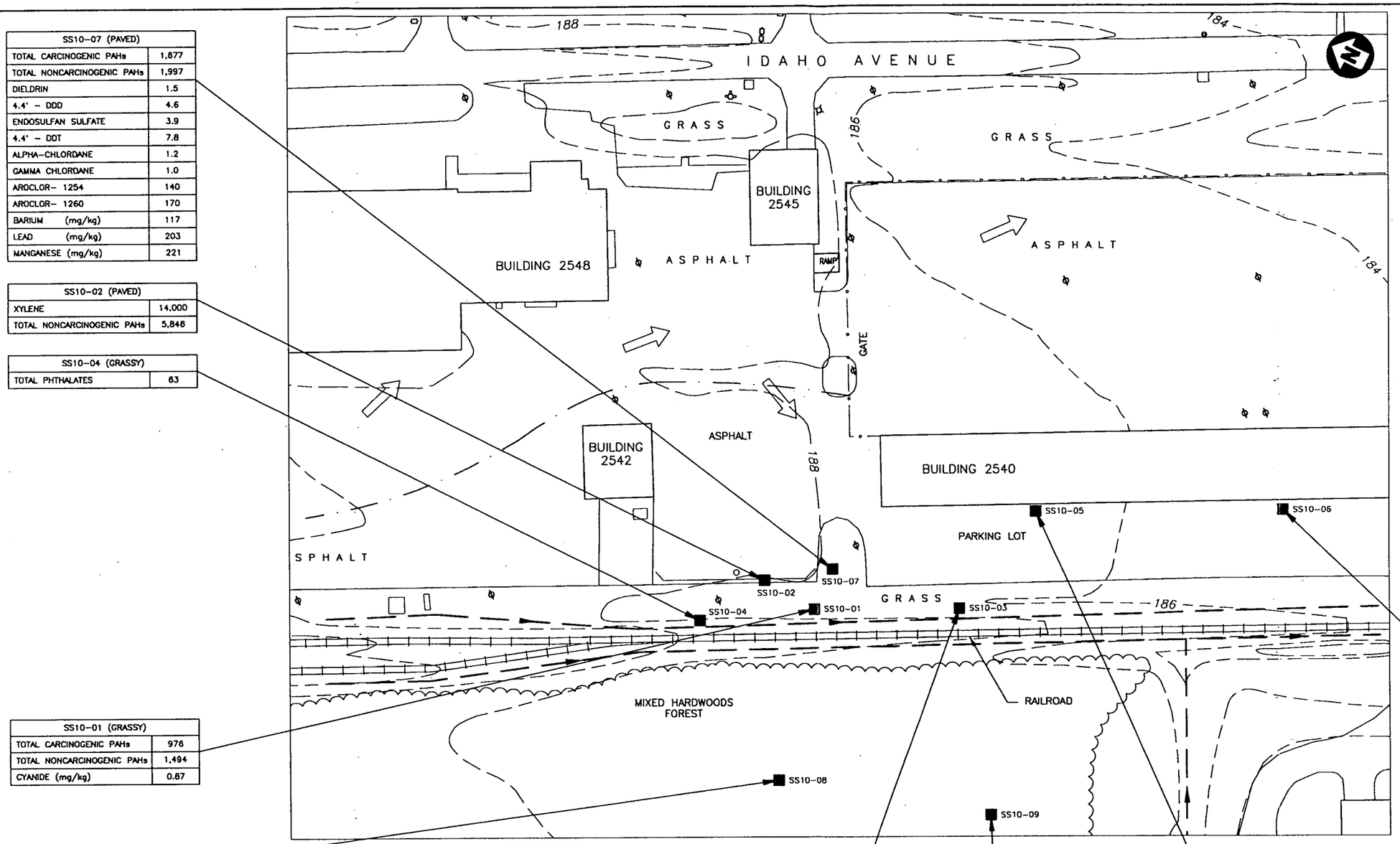

SS10-07 (PAVED)	
TOTAL CARCINOGENIC PAHs	1,877
TOTAL NONCARCINOGENIC PAHs	1,997
DIELDRIN	1.5
4.4' – DDD	4.6
ENDOSULFAN SULFATE	3.9
4.4' – DDT	7.8
ALPHA–CHLORDANE	1.2
GAMMA CHLORDANE	1.0
AROCLOR– 1254	140
AROCLOR– 1260	170
BARIUM (mg/kg)	117
LEAD (mg/kg)	203
MANGANESE (mg/kg)	221

SS10-02 (PAVED)	
XYLENE	14,000
TOTAL NONCARCINOGENIC PAHs	5,848

SS10-04 (GRASSY)	
TOTAL PHTHALATES	83

SS10-01 (GRASSY)	
TOTAL CARCINOGENIC PAHs	976
TOTAL NONCARCINOGENIC PAHs	1,494
CYANIDE (mg/kg)	0.87

* SS10-08 (BACKGROUND)

SS10-03 (GRASSY)	
TOTAL CARCINOGENIC PAHs	422
TOTAL NONCARCINOGENIC PAHs	456
PHTHALATES	69
CADMIUM (mg/kg)	3.0
COBALT (mg/kg)	5.6
LEAD (mg/kg)	252
SODIUM (mg/kg)	193
ZINC (mg/kg)	129
CYANIDE (mg/kg)	1.0

* SS10-08 (BACKGROUND)

SS10-05 (PAVED)	
TOTAL CARCINOGENIC PAHs	94
TOTAL NONCARCINOGENIC PAHs	980
CALCIUM (mg/kg)	203,000
MAGNESIUM (mg/kg)	9,860
SODIUM (mg/kg)	211

SS10-06 (PAVED)	
TOTAL CARCINOGENIC PAHs	1,260
TOTAL NONCARCINOGENIC PAHs	1,674
AROCLOR– 1260	27
CALCIUM (mg/kg)	62,200

NOTES:

1. THIS FIGURE PRESENTS ALL VOLATILE ORGANIC COMPOUNDS, PESTICIDES AND PCBs (SEE NOTE 4) DETECTED IN THE SURFACE SOIL SAMPLES. SEMIVOLATILE ORGANIC COMPOUNDS HAVE BEEN GROUPED INTO: TOTAL PHTHALATES, TOTAL NON–CARCINOGENIC PAHs (SEE NOTE 2); AND TOTAL CARCINOGENIC PAHs (SEE NOTE 3). ALL DETECTIONS ARE REPORTED IN ug/kg UNLESS OTHERWISE INDICATED.

2. TOTAL NON–CARCINOGENIC PAHs = THE TOTAL OF THESE NON–CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBON COMPOUNDS: ACENAPHTHENE FLOURENE, PHENANTHRENE, ANTHRACENE, FLUORATHENE, PYRENE, BENZO(G,H,I,)PERYLENE, NAPHTHALENE, 2– METHYLNAPHTHALENE AND ACENAPHTHYLENE.

3. TOTAL CARCINOGENIC PAHs = THE TOTAL OF THE CONCENTRATIONS OF THESE CARCINOGENIC OR POTENTIALLY CARCENOGENIC POLYCYCLIC AROMATIC HYDROCARBON COMPOUNDS: CARBAZOLE, BENZO(A)ANTHRACENE, CHRYSENE, BENZO (B)FLUORANTHENE, BENZO(K)FLUORANTHENE, BENZO(A)PYRENE, INDENO(1, 2, 3–CD)PYRENE AND DIBENZO(A, H)ANTHRACENE.

4. ONLY METALS DETECTIONS WHOSE CONCENTRATIONS EXCEEDED TWO–TIMES THE MAXIMUM DETECTED IN THE BACKGROUND SAMPLES ARE REPORTED (SEE NOTE 5–1).

5. NOT ALL SAMPLES WERE ANALYZED FOR ALL CLASSES OF COMPOUNDS (SEE TABLE 3–1).

LEGEND:

- SS10-01 — SOIL SAMPLE LOCATION
- APPROXIMATE SURFACE WATER FLOW DIRECTION
- APPROXIMATE SURFACE WATER DIVIDE
- DRAINAGE CHANNEL AND FLOW DIRECTION
- * — BACKGROUND SAMPLE

80' 40' 0 80'
Approximate Scale in Feet

SOURCE: URS CONSULTANTS, INC.

DATE: 09/07/96 (SEH)
Xref: SS010BSX.DWG
H:\CAD\727307\SS-010\FIG3-7.DWG (PS= 1/80XP PLOT= CALBW)

FIGURE 3–7

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS–010 RI
SURFACE SOIL CONTAMINATION

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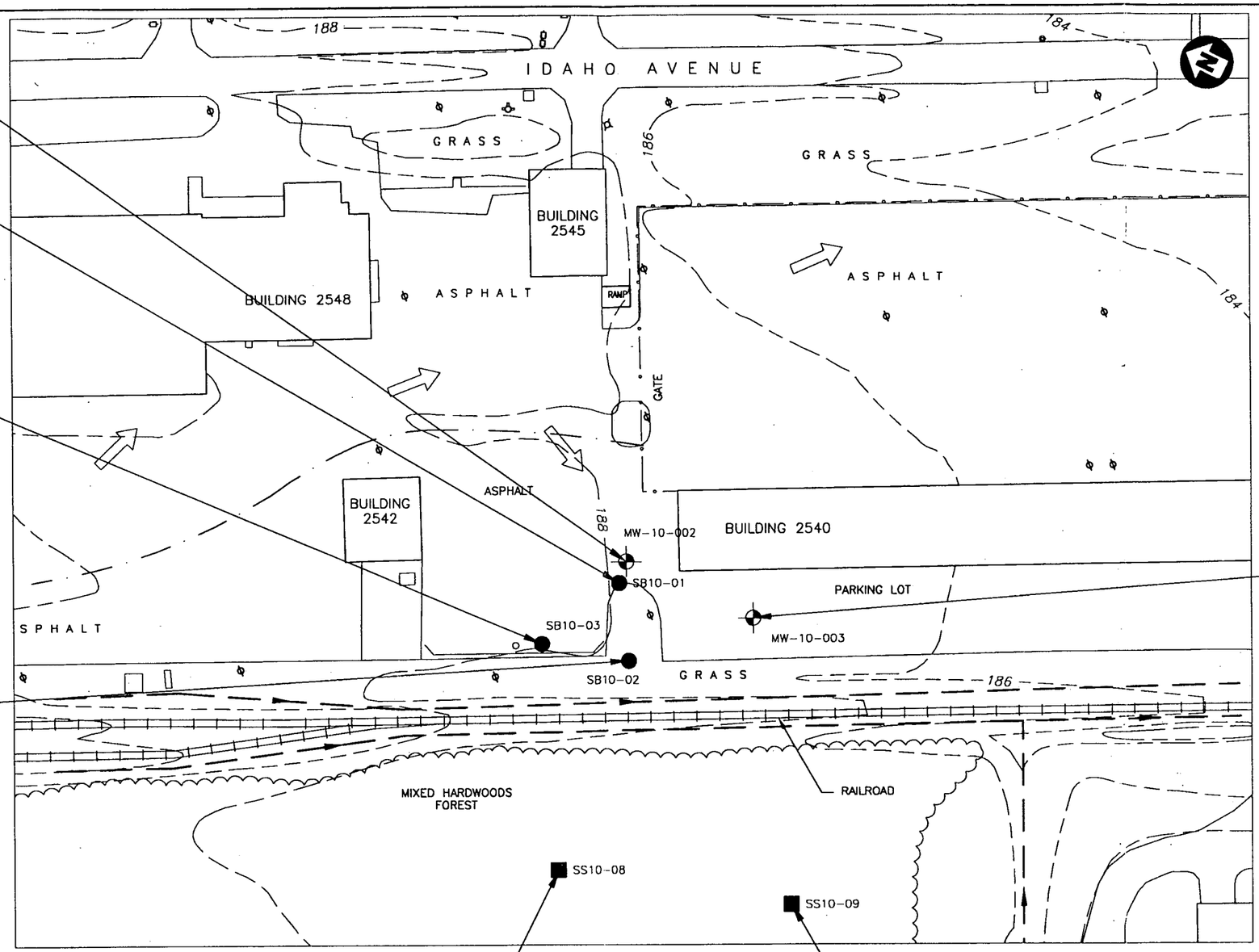
MW10-02-1 (PAVED)	
ETHYLBENZENE	260
XYLENE (TOTAL)	3,000
TOTAL NONCARCINOGENIC PAHs	4,507
TOTAL CARCINOGENIC PAHs	104

SB10-01-0 (PAVED)	
TOTAL NONCARCINOGENIC PAHs	8,876
SB10-01-2 (PAVED)	
ACETONE	1,000
1, 1-DICHLOROETHENE	620
XYLENE (TOTAL)	13,000
TOTAL NONCARCINOGENIC PAHs	16,646
ENDOSULFAN II	1.8
ENDOSULFAN SULFATE	1.7
AROCLOR- 1260	21

SB10-03-0 (PAVED)	
ETHYLBENZENE	6,500
XYLENE (TOTAL)	40,000
TOTAL NONCARCINOGENIC PAHs	51,000
ENDOSULFAN II	9.6
ENDOSULFAN SULFATE	9.2
SB10-03-2 (PAVED)	
XYLENE (TOTAL)	92
TOTAL NONCARCINOGENIC PAHs	640
SB10-03-4 (PAVED)	
METHYLENE CHLORIDE	4
ACETONE	140
2- BUTANONE	51
XYLENE (TOTAL)	290

SB10-02-0 (GRASSY)	
2- BUTANONE	120
ETHYLBENZENE	460
XYLENE (TOTAL)	1,900
TOTAL NONCARCINOGENIC PAHs	8,450
TOTAL CARCINOGENIC PAHs	680
TOTAL PHTHALATES	170
4, 4'- DDE	0.98
4, 4'- DDD	8.7
ENDOSULFAN SULFATE	1.2
4, 4'- DDT	0.87
METHOXYCHLOR	2.1
ENDRIN ALDEHYDE	1.2
AROCLOR- 1254	26
AROCLOR- 1260	42
LEAD (mg/kg)	26.4
SB10-02-2 (GRASSY)	
TOTAL NONCARCINOGENIC PAHs	52
TOTAL PHTHALATES	53



MW10-03-0 (PAVED)	
ACETONE	97
CARBON DISULFIDE	1
2- BUTANONE	16
ETHYLBENZENE	15
XYLENE (TOTAL)	130
TOTAL NONCARCINOGENIC PAHs	2,963

NOTES:

1. THIS FIGURE PRESENTS ALL VOLATILE ORGANIC COMPOUNDS, PESTICIDES AND PCBs (SEE NOTE 4) DETECTED IN THE SUBSURFACE SOIL SAMPLES. SEMIVOLATILE ORGANIC COMPOUNDS HAVE BEEN GROUPED INTO: TOTAL PHTHALATES, TOTAL NON-CARCINOGENIC PAHs (SEE NOTE 2): AND TOTAL CARCINOGENIC PAHs (SEE NOTE 3). ALL DETECTIONS ARE REPORTED IN ug/kg UNLESS OTHERWISE INDICATED.

2. TOTAL NON-CARCINOGENIC PAHs = THE TOTAL OF THESE NON-CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBON COMPOUNDS: ACENAPHTHENE, FLOURENE, PHENANTHRENE, ANTHRACENE, FLUORATHENE, PYRENE, AND BENZO(G.H.I.)PERYLENE, NAPHTHALENE, 2- METHYLNAPHTHALENE AND DIBENZOFURAN.

3. TOTAL CARCINOGENIC PAHs = THE TOTAL OF THE CONCENTRATIONS OF THESE CARCINOGENIC OR POTENTIALLY CARCENOGENIC POLYCYCLIC AROMATIC HYDROCARBON COMPOUNDS: CARBAZOLE, BENZO(A)ANTHRACENE, CHRYSENE, BENZO(B) FLUORANTHENE, BENZO(K)FLUORANTHENE, BENZO(A) PYRENE, INDENO(1, 2, 3-CD)PYRENE AND DIBENZO(A, H)ANTHRACENE.

4. ONLY METALS DETECTIONS WHOSE CONCENTRATIONS EXCEEDED TWO-TIMES THE MAXIMUM DETECTED IN THE BACKGROUND SAMPLES ARE REPORTED (SEE NOTE 5-5).

5. NOT ALL SAMPLES WERE ANALYZED FOR ALL CLASSES OF COMPOUNDS.

LEGEND:

- SS10-01 — SOIL SAMPLE LOCATION
- MW10-02 — MONITORING WELL LOCATION
- SB10-01 — SOIL BORING LOCATION
- APPROXIMATE SURFACE WATER FLOW DIRECTION
- APPROXIMATE SURFACE WATER DIVIDE
- DRAINAGE CHANNEL AND FLOW DIRECTION
- * — BACKGROUND SAMPLE

80' 40' 0 80'
Approximate Scale in Feet

SOURCE: URS CONSULTANTS, INC.

DATE: 09/07/96 (SEH)
Xref: SS010BSX.DWG
I:\USERS\40919\SS-010\FIG3-8.DWG (PS= 1/80XP PLOT= CALBW)

FIGURE 3-8

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010 RI
SUBSURFACE SOIL CONTAMINATION

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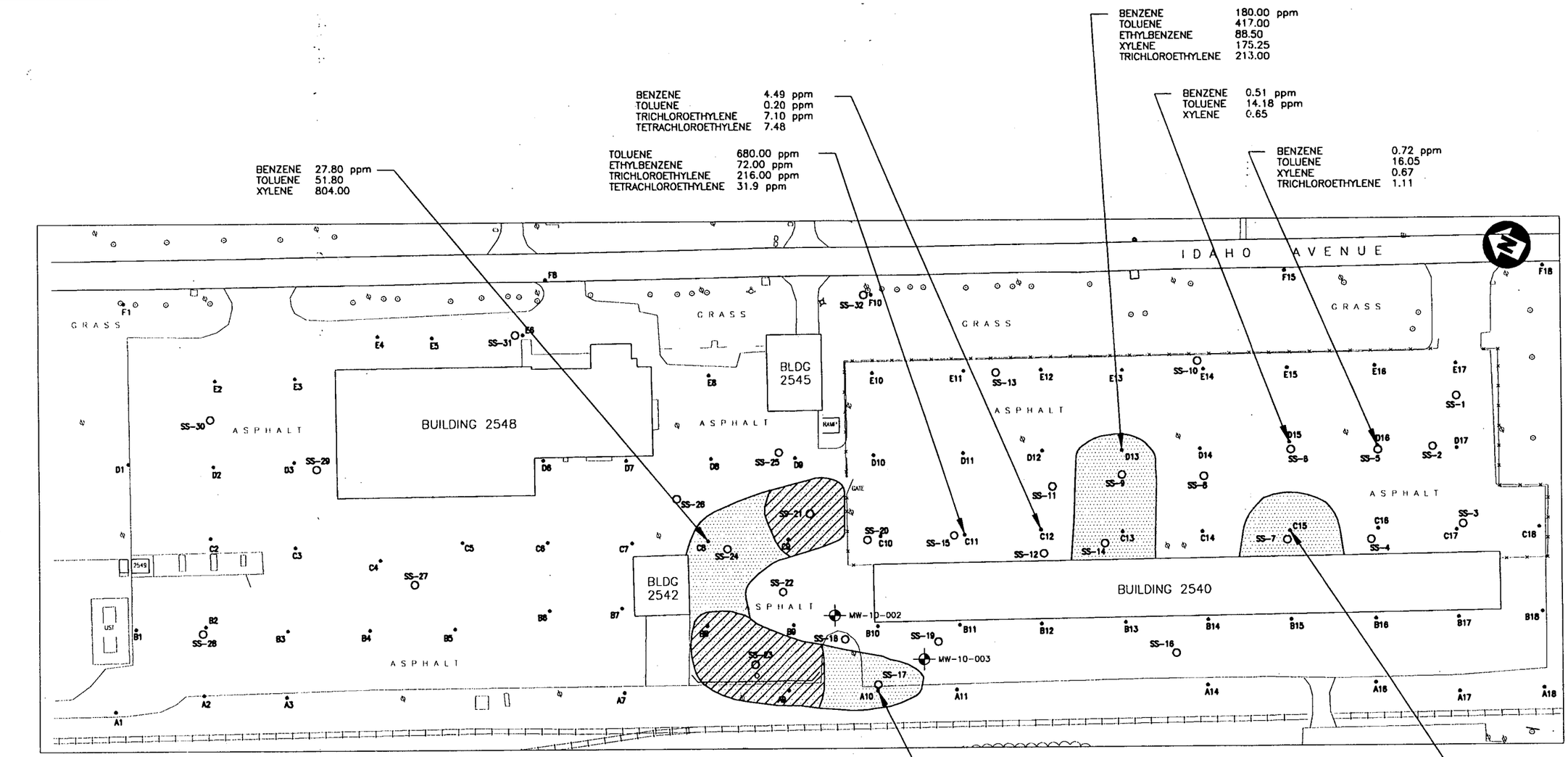

LEGEND:

- A7 — SOIL VAPOR SAMPLE LOCATION
- SS-27 — SOIL SAMPLE LOCATION
- MW-10-002 — MONITORING WELL LOCATION
- FIRE HYDRANT LOCATION
- UTILITY POLE
- APPROXIMATE AREA OF SOIL CONTAINING PETROLEUM HYDROCARBONS
- APPROXIMATE AREA OF SOIL CONTAINING TCE AND PETROLEUM HYDROCARBONS

SOURCE: OHM REMEDIATION SERVICE CORP.
PROJECT No. 17257
DRAWING No. 17257-D8

DATE: 09/17/96 (SEH)
Xref: 17257-D8.DWG
H:\CAD\727307\SS-010\FIG3-9.DWG (PS= 1/100XP PLOT= CALBW)

FIGURE 3-9

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
DELINEATION INVESTIGATION
SOIL GAS SCREENING SURVEY RESULTS

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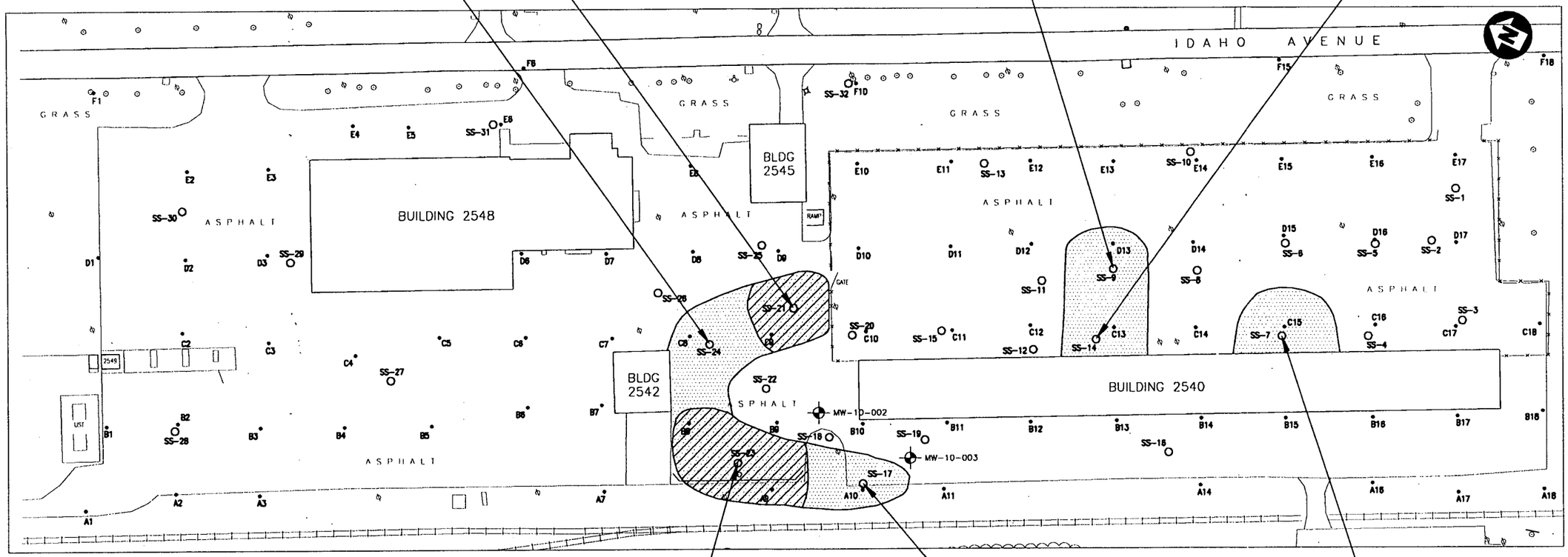
ETHYLBENZENE 33.3 mg/kg
XYLENE 20.4 mg/kg
TRICHLOROETHYLENE 3.03 mg/kg
TOTAL VOCs 138.4 mg/kg

ETHYLBENZENE 6.7 mg/kg
XYLENE 11.0 mg/kg
TOTAL VOCs 80.2 mg/kg

XYLENE 5.6 mg/kg
TOTAL VOCs 34.2 mg/kg

XYLENE 0.344 mg/kg



ETHYLBENZENE 1.1 mg/kg
TRICHLOROETHYLENE 8.08 mg/kg
TOTAL VOCs 41.2 mg/kg

BENZO (A) ANTHRACENE 4.05 mg/kg
BENZO (A) PYRENE 3.65 mg/kg

ETHYLBENZENE 5.17 mg/kg
XYLENE 5.52 mg/kg
TOTAL VOCs 26.30 mg/kg

100' 50' 0 100'
Approximate Scale in Feet

LEGEND:

- SOIL VAPOR SAMPLE LOCATION (A7)
- SOIL SAMPLE LOCATION (SS-27)
- MONITORING WELL LOCATION (MW-10-002)
- FIRE HYDRANT LOCATION
- UTILITY POLE
- APPROXIMATE AREA OF SOIL CONTAINING PETROLEUM HYDROCARBONS
- APPROXIMATE AREA OF SOIL CONTAINING TCE AND PETROLEUM HYDROCARBONS

SOURCE: OHM REMEDIATION SERVICE CORP.
PROJECT No. 17257
DRAWING No. 17257-D8

DATE: 09/12/96 (SEH)
Xref: 17257-D8.DWG
H:\CAD\727307\SS-010\FIG3-10.DWG (PS= 1/100XP PLOT= CALBW)

FIGURE 3-10

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
DELINEATION INVESTIGATION
SOIL SAMPLE RESULTS

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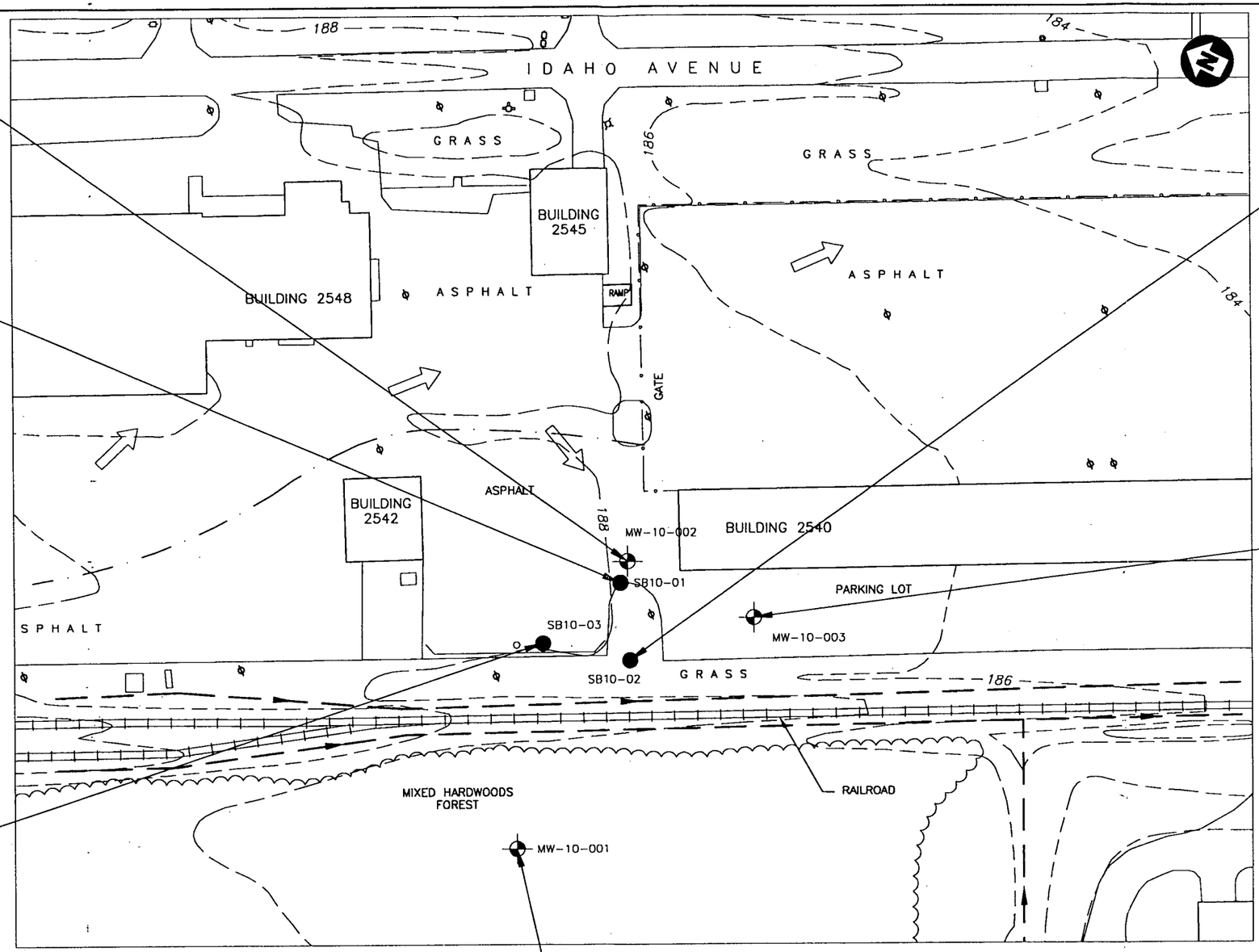
MWHP10-02-5 (PAVED)	
CARBON DISULFIDE	2
ETHYLBENZENE	7
XYLENE (TOTAL)	250
NAPHTHALENE	6
2- METHYLNAPHTHALENE	7
BIS (2- ETHYLHEXYL)PHTHALATE	2
MWHP10-02-27 (PAVED)	
CARBON DISULFIDE	61
XYLENE (TOTAL)	24
2- METHYLNAPHTHALENE	1

HP10-01-5 (PAVED)	
ACETONE	6
CARBON DISULFIDE	4
ETHYLBENZENE	5
XYLENE (TOTAL)	34
NAPHTHALENE	34
2- METHYLNAPHTHALENE	43
BIS (2- ETHYLHEXYL)PHTHALATE	3
PYRENE	2
BENZO(B)FLUORANTHENE	2
BENZO(A)PYRENE	1
BENZO(G, H, I)PERYLENE	1
HP10-01-15 (PAVED)	
ACETONE	4
CARBON DISULFIDE	22
ETHYLBENZENE	9
XYLENE (TOTAL)	58
NAPHTHALENE	16
2- METHYLNAPHTHALENE	24
BUTYLBENXYLPHTHALATE	2
BIS (2- ETHYLHEXYL) PHTHALATE	2
HP10-01-34 (PAVED)	
ACETONE	4
CARBON DISULFIDE	2
ETHYLBENZENE	2
XYLENE (TOTAL)	11
NAPHTHALENE	2
2- METHYLNAPHTHALENE	4
BIS (2- ETHYLHEXYL) PHTHALATE	2

HP10-03-7 (PAVED)	
ETHYLBENZENE	35
XYLENE (TOTAL)	230
NAPHTHALENE	4
2- METHYLNAPHTHALENE	5
HP10-03-24 (PAVED)	
ETHYLBENZENE	11
XYLENE (TOTAL)	90
NAPHTHALENE	15
2- METHYLNAPHTHALENE	12
DIETHYLPHTHALATE	2



MWHP10-01-6 (PAVED)	
ETHYLBENZENE	1
XYLENE (TOTAL)	8
HP10-01-17 (PAVED)	
DIETHYLPHTHALATE	3
BIS (2- ETHYLHEXYL) PHTHALATE	2

HP10-02-5 (GRASSY)	
ACETONE	7
CARBON DISULFIDE	1
2- BUTANONE	39
BENZENE	10
ETHYLBENZENE	9
XYLENE (TOTAL)	520
2, 4- DIMETHYLPHENOL	3
NAPHTHALENE	17
2- METHYLNAPHTHALENE	5
BIS (2- ETHYLHEXYL) PHTHALATE	13
HP10-02-29 (GRASSY)	
ACETONE	5
CARBON DISULFIDE	2
ETHYLBENZENE	3
XYLENE (TOTAL)	100
NAPHTHALENE	3
2- METHYLNAPHTHALENE	1
BIS (2- ETHYLHEXYL) PHTHALATE	2

MWHP10-03-5 (PAVED)	
ETHYLBENZENE	82
XYLENE (TOTAL)	940
2, 4- DIMETHYLPHENOL	7
NAPHTHALENE	30
2- METHYLNAPHTHALENE	47
BIS (2- ETHYLHEXYL) PHTHALATE	7
MWHP10-03-21 (PAVED)	
TRICHLOROETHENE	2
NAPHTHALENE	1
2- METHYLNAPHTHALENE	4

NOTES:

1. THIS FIGURE PRESENTS ALL VOLATILE AND ORGANIC COMPOUNDS, DETECTED IN THE SEMIVOLATILE GROUNDWATER SCREENING SAMPLES. ALL DETECTIONS ARE REPORTED IN ug/kg UNLESS OTHERWISE INDICATED.

LEGEND:

- SS10-01 — SOIL SAMPLE LOCATION
- MW10-02 — MONITORING WELL LOCATION
- SB10-01 — SOIL BORING LOCATION
- APPROXIMATE SURFACE WATER FLOW DIRECTION
- APPROXIMATE SURFACE WATER DIVIDE
- * — BACKGROUND SAMPLE
- DRAINAGE CHANNEL AND FLOW DIRECTION

80' 40' 0 80'
Approximate Scale in Feet

SOURCE: URS CONSULTANTS, INC.

DATE: 09/12/96 (SEH)
Xref: SS010BSX.DWG
H:\CAD\727307\SS-010\FIG3-11.DWG (PS= 1/80XP PLOT= CALBW)

FIGURE 3-11

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010 RI
GROUNDWATER SCREENING RESULTS

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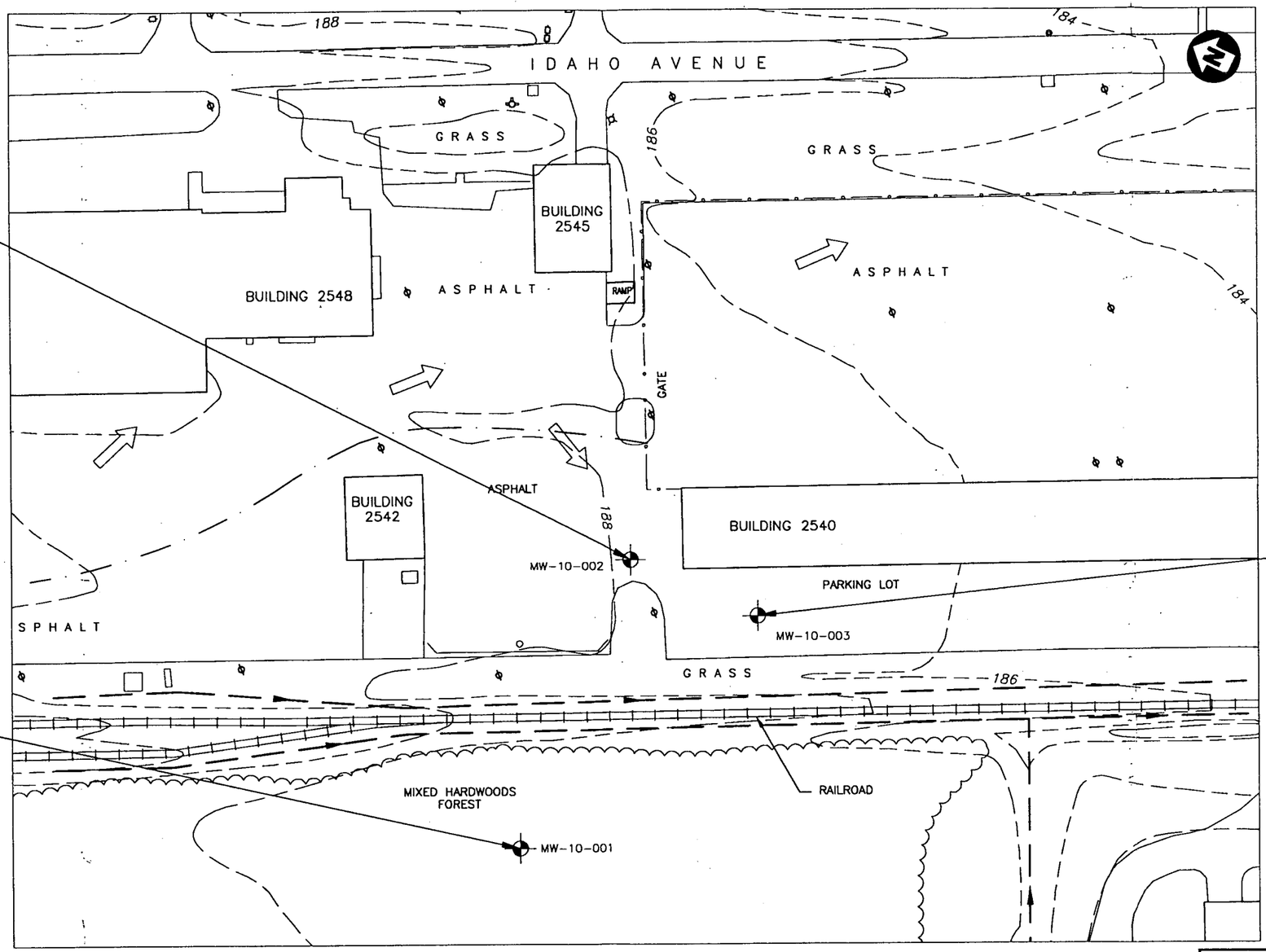
MW-10-002 (PAVED)		
	UNFILTERED	FILTERED
ALUMINUM	1,270	49.1
ARSENIC	1.6	1.1
BARIUM	18.0	26.1
CALCIUM	39,900	51,200
CHROMIUM	8.0	5.7
COPPER	4.2	ND
IRON	13,700	10,900
LEAD	1.6	1.0
MAGNESIUM	11,000	12,700
MANGANESE	514	581
MERCURY	0.2	ND
NICKEL	4.6	ND
POTASSIUM	2,000	1,600
SODIUM	1,440,000	12,600
THALLIUM	4.3	ND
VANADIUM	7.0	ND
ZINC	44.0	31.9

MW-10-001 (TREES)		
	UNFILTERED	FILTERED
ALUMINUM	15,500	53.2
ARSENIC	6.9	ND
BARIUM	78.8	17.2
BERYLLIUM	1.5	ND
CADMIUM	2.5	ND
CALCIUM	48,700	42,200
CHROMIUM	43.3	5.0
COBALT	26.6	ND
COPPER	40.4	ND
IRON	56,800	46.3
LEAD	9.6	ND
MAGNESIUM	26,100	17,500
MANGANESE	671	225
NICKEL	31.7	ND
POTASSIUM	4,460	ND
SODIUM	4,300	5,140
VANADIUM	67.6	ND
ZINC	124	18.8



80' 40' 0 80'

Approximate Scale in Feet

LEGEND:

- MW-010-001 — MONITORING WELL LOCATION
- APPROXIMATE SURFACE WATER FLOW DIRECTION
- APPROXIMATE SURFACE WATER DIVIDE
- DRAINAGE CHANNEL AND FLOW DIRECTION
- EXCEEDS ARAR

NOTE:

1. THIS FIGURE PRESENTS ALL VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS, PESTICIDES, PCBs AND METALS DETECTED IN THE ROUND 1 GROUNDWATER SAMPLES. ALL DETECTIONS ARE REPORTED IN ug/L.

MW-10-003 (TREES)		
ACETONE		6
CARBON DISULFIDE		2
XYLENES		6
	UNFILTERED	FILTERED
ALUMINUM	487	79.7
ARSENIC	1.1	ND
BARIUM	21.0	21.1
CALCIUM	64,400	60,100
CHROMIUM	6.4	6.6
COPPER	3.4	ND
IRON	11,600	9,550
MAGNESIUM	13,400	14,300
MANGANESE	482	430
NICKEL	ND	8.4
POTASSIUM	1,300	ND
SODIUM	13,800	15,200
ZINC	56.7	20.0

SOURCE: URS CONSULTANTS, INC.

DATE: 09/07/96 (SEH)
Xref: SS010BSX.DWG
I:\USERS\40919\SS-010\FIG3-12.DWG (PS= 1/80XP PLOT= CALBW)

FIGURE 3-12

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010 RI
GROUNDWATER RESULTS - ROUND 1

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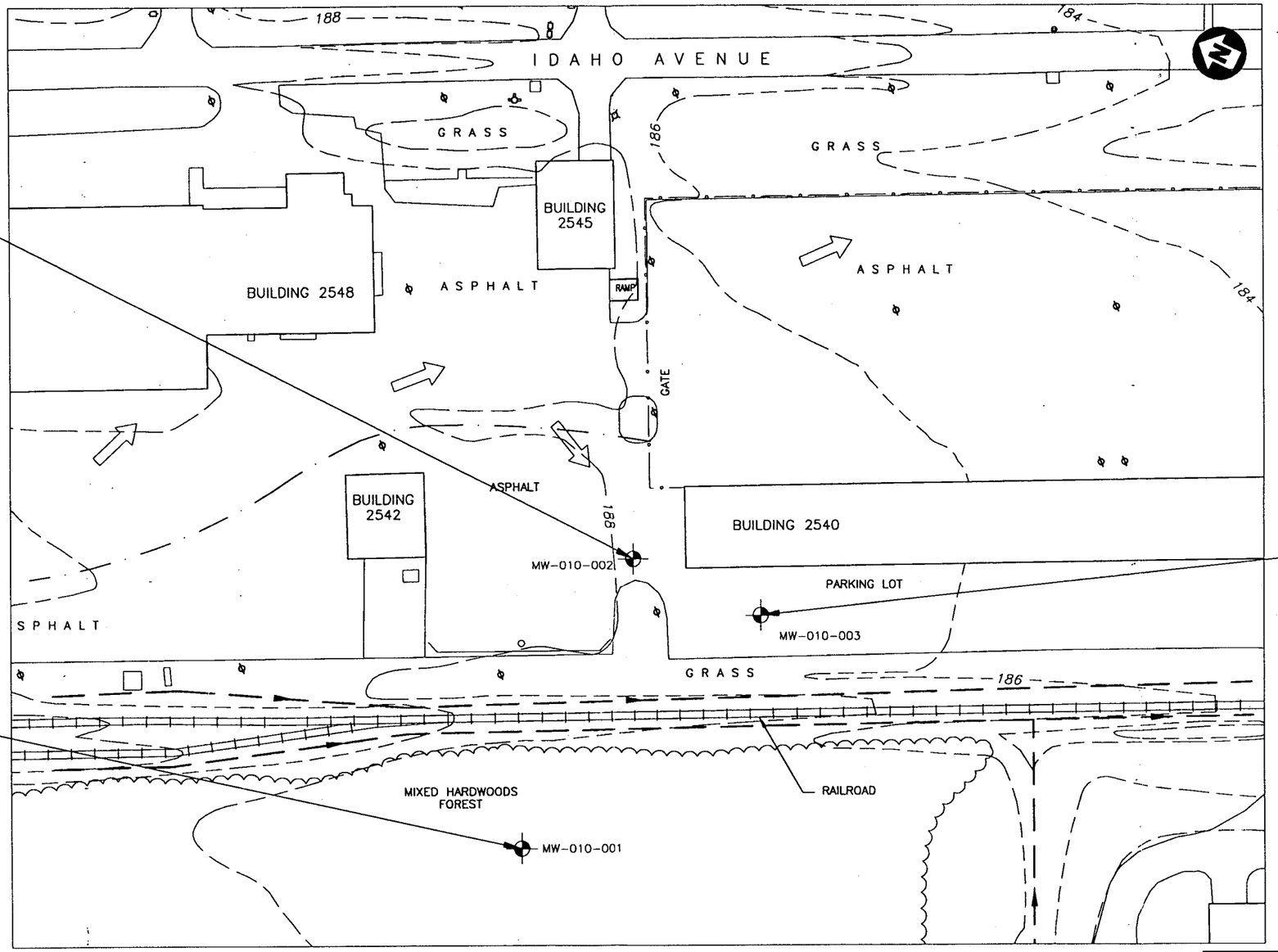
MW-010-002 (PAVED)	
METHYLENE CHLORIDE	0.9
1,2- DICHLOROETHANE	2.8
BIS(2- ETHYLHEXYL)PHTHALATE	2

	UNFILTERED	FILTERED
ALUMINUM	3,160	69.8
ARSENIC	2.2	ND
BARIUM	24.9	ND
CALCIUM	53,500	51,600
CHROMIUM	7.3	ND
COBALT	7.5	ND
COPPER	12.4	ND
IRON	18,000	12,200
LEAD	5.1	ND
MAGNESIUM	14,400	12,700
MANGANESE	587	553
NICKEL	10	5.7
POTASSIUM	5,050	ND
SODIUM	10,600	11,300
VANADIUM	10.6	ND
ZINC	56.7	13.1
CYANIDE	11	ND

MW-010-001 (TREES)	
CHLOROMETHANE	13
1,2- DICHLOROETHANE	6.4
BUTYLBENZYLPHTHALATE	2

	UNFILTERED	FILTERED
ALUMINUM	19,500	73.3
ARSENIC	14.2	ND
BARIUM	88.8	24.6
BERYLLIUM	1.8	ND
CALCIUM	53,100	41,800
CHROMIUM	46	ND
COBALT	29.6	ND
COPPER	45.9	ND
IRON	67,500	127
LEAD	12.5	ND
MAGNESIUM	30,000	16,500
MANGANESE	882	317
NICKEL	41.5	ND
POTASSIUM	7,330	ND
SODIUM	5,640	7,850
VANADIUM	82.4	ND
ZINC	155	37.3



80' 40' 0 80'

Approximate Scale in Feet

LEGEND:

- MW-010-001 — MONITORING WELL LOCATION
- APPROXIMATE SURFACE WATER FLOW DIRECTION
- APPROXIMATE SURFACE WATER DIVIDE
- DRAINAGE CHANNEL AND FLOW DIRECTION
- EXCEEDS ARAR

NOTE:

1. THIS FIGURE PRESENTS ALL VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS, PESTICIDES, PCBs AND METALS DETECTED IN THE ROUND 2 GROUNDWATER SAMPLES. ALL DETECTIONS ARE REPORTED IN ug/L.

MW-010-003 (TREES)	
CHLOROMETHANE	19
CHLOROETHANE	1.5
METHYLENE CHLORIDE	2.0
ACETONE	30
1,2- DICHLOROETHANE	6.3
BENZENE	1.2
XYLENE	18
NAPTHALENE	1
BIS(2-ETHYLHEXYL)PHTHALATE	2

	UNFILTERED	FILTERED
ALUMINUM	315	79.7
BARIUM	17.1	17.5
CALCIUM	61,400	58,900
COPPER	4.1	ND
IRON	11,200	9,880
MAGNESIUM	14,300	13,800
MANGANESE	460	441
SODIUM	14,000	13,500
ZINC	11.1	21.6

SOURCE: URS CONSULTANTS, INC.

DATE: 09/07/96 (SEH)
Xref: SS010BSX.DWG
I:\USERS\40919\SS-010\FIG3-13.DWG (PS= 1/80XP PLOT= CALBW)

FIGURE 3-13

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010 RI
GROUNDWATER RESULTS - ROUND 2

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TABLE 3-1

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION STRATIGRAPHIC SUMMARY

STRATIGRAPHIC UNIT	AQUIFER TYPE	HYDRAULIC CONDUCTIVITY (cm/sec)	DESCRIPTION	THICKNESS RANGE (ft.)
Sand/Silty Sand	UNCONFINED	1.1E-02 to 3.7E-03	Brown to gray, fine to coarse Sand/Silty Sand.	32-35
Silt and Clay	NA	7.0E-07 to 1.0E-08*	Gray, very stiff.	2-27*
Glacial Till	NA	NA	*Gray medium to very dense mixture of Silt, Sand, and Clay with Gravel, Cobbles and Boulders.	0-24*
Carbonate Bedrock	LEAKY CONFINING	1.0E-02 to 1.0E-05*	*Gray	UNKNOWN

*Source: Malcolm Pirnie, 1993.
NA - Not Applicable.

TABLE 3-2

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION
DETECTED ORGANIC ANALYTES IN BACKGROUND SURFACE SOIL SAMPLES

ANALYTE	*TBC VALUE	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	AVERAGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION
4,4'-DDE	2,100	1/1	3.6	3.6	3.6	SS10-08
Endosulfan II	900	1/1	49	49	49	SS10-08
4,4'-DDT	2,100	1/1	15	15	15	SS10-08
Endrin aldehyde	—	1/1	12	12**	12	SS10-08

Results reported in µg/kg.
Only detected results are reported.
Only SS10-08 was considered for background organics.
Samples were obtained from a depth of 0-2 ft.
*TBC To Be Considered
— - No TBC available.
**Maximum value obtained from duplicate sample.

TABLE 3-2 (Cont'd)

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION
DETECTED ORGANIC ANALYTES IN BACKGROUND SURFACE SOIL SAMPLES

ANALYTE	*TBC VALUE	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	AVERAGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION
Aluminum	—	3/3	422	7,620	4301	SS13-19
Antimony	—	1/3	12.6	12.6**	12.6	SS10-08
Arsenic	7.5	4/4	0.23	10.9	3.30	SS10-08
Barium	300	4/4	7.5	27.1	21.1	SS13-19
Beryllium	0.16	2/3	0.28	0.74	0.51	SS10-08
Cadmium	1	1/4	1.3	1.3	1.3	SS10-08
Calcium	—	3/3	1,090	28,300	11,200	SS10-08
Chromium	10	4/4	2.0	21.3	8.92	SS10-08
Cobalt	30	2/3	1.5	2.5	2.0	SS10-08
Copper	25	3/3	2.2	46.9	19.0	SS10-08
Iron	2,000	3/3	1,610	18,100	8,853	SS10-08
Lead	500	4/4	4.4	29.2	15.5	SS10-08
Magnesium	—	3/3	445	2,830	1,438	SS10-08
Manganese	—	3/3	24.5	207	95.5	SS10-08
Mercury	0.1	1/4	0.37	0.37	0.37	SS04-029
Nickel	13	2/3	4.1	11.3	7.70	SS10-08
Potassium	—	1/3	336	336	336	SS13-19
Selenium	2	1/4	2.2	2.2	2.2	SS10-08
Silver	—	0/4	ND	ND	ND	ND
Sodium	—	3/3	26.5	75.9	53.9	SS10-08
Thallium	—	0/3	ND	ND	ND	ND
Vanadium	150	3/3	10.5	120	47.6	SS10-08
Zinc	20	3/3	11.4	50**	26.6	SS10-08
Cyanide	—	0/3	ND	ND	ND	ND

Results reported in mg/kg.

Samples used for background surface soil include SS10-08, SS10-09, SS04-029 and SS13-19.

Samples were obtained from a depth of 0-2 ft.

*TBC To Be Considered

— - No TBC available.

**Maximum value obtained from duplicate sample.

ND - Not detected.

- Exceeds TBC

TABLE 3-4

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION DETECTED ANALYTES IN SURFACE SOILS FROM UNPAVED AREAS

ANALYTE	*TBC VALUE	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	AVERAGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION
Acenaphthene	50,000	1/3	42	42	42	SS10-01
Fluorene	50,000	1/3	41	41	41	SS10-01
Phenanthrene	50,000	2/3	90	380	235	SS10-01
Anthracene	50,000	1/3	61	61	61	SS10-01
Carbazole	—	1/3	75	75	75	SS10-01
Di-n-butylphthalate	8,100	1/3	63	63	63	SS10-04
Fluoranthene	50,000	2/3	120	400	260	SS10-01
Pyrene	50,000	2/3	150	420	285	SS10-01
Benzo(a)anthracene	224	2/3	58	160	109	SS10-01
Chrysene	400	2/3	68	180	124	SS10-01
bis(2-Ethylhexyl)phthalate	50,000	1/3	69	69	69	SS10-03
Benzo(b)fluoranthene	1,100	2/3	92	200	146	SS10-01
Benzo(k)fluoranthene	1,100	2/3	38	71	54.5	SS10-01
Benzo(a)pyrene	61	2/3	72	170	121	SS10-01
Indeno(1,2,3-cd)pyrene	3,200	2/3	64	120	92	SS10-01
Dibenz(a,h)anthracene	14	1/3	30	30	30	SS10-03
Benzo(g,h,i)perylene	50,000	2/3	96	150	123	SS10-01
Aluminum (mg/kg)	—	3/3	1,400	3,450	2,203.3	SS10-03
Arsenic (mg/kg)	7.5	3/3	0.85	2.5	1.48	SS10-03
Barium (mg/kg)	300	3/3	7.9	33.6	18.2	SS10-03
Beryllium (mg/kg)	0.16	3/3	0.08	0.31	0.17	SS10-03
Cadmium (mg/kg)	1	3/3	0.91	3.0	1.61	SS10-03
Calcium (mg/kg)	—	3/3	872	45,700	15,900.7	SS10-03
Chromium (mg/kg)	10	3/3	5.8	23.3	12.2	SS10-03
Cobalt (mg/kg)	30	3/3	2.4	5.6	3.5	SS10-03
Copper (mg/kg)	25	3/3	4.1	17.8	8.9	SS10-03
Iron (mg/kg)	2,000	3/3	4,130	14,100	7,726.7	SS10-03
Lead (mg/kg)	500	3/3	39.9	252	112.4	SS10-03
Magnesium (mg/kg)	—	3/3	697	4,260	1,927.7	SS10-03
Manganese (mg/kg)	—	3/3	35.2	284	123.4	SS10-03
Nickel (mg/kg)	13	3/3	4.7	14	8.97	SS10-03
Potassium (mg/kg)	—	3/3	187	420	277.3	SS10-03
Selenium (mg/kg)	2	2/3	0.27	0.28	0.28	SS10-03
Sodium (mg/kg)	—	1/3	193	193	193	SS10-03
Vanadium (mg/kg)	150	3/3	13.5	47.3	28.2	SS10-03
Zinc (mg/kg)	20	3/3	32.7	129	67.1	SS10-03
Cyanide (mg/kg)	—	2/3	0.87	1.0	0.94	SS10-03

Results reported in µg/kg unless otherwise specified.

*TBC To Be Considered

— - No TBC available.

Samples used for surface soil beneath unpaved areas include SS10-01, SS10-03, and SS10-04

- Exceeds TBC.

TABLE 3-5

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION BACKGROUND SUBSURFACE SOIL SAMPLE RESULTS

ANALYTE	*TBC VALUE	FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	AVERAGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION
Aluminum	-	8/8	722	9,340	3,349	SS13-19-3
Antimony	-	0/8	ND	ND	ND	ND
Arsenic	7.5	8/9	0.41	3.0	1.10	BS-BK4-04
Barium	300	9/9	1.8	55.9**	15.4	SS13-19-3
Beryllium	0.16	0/8	ND	ND	ND	ND
Cadmium	1	0/9	ND	ND	ND	ND
Calcium	-	8/8	422	27,800	4,366	BS-BK4-04
Chromium	10	9/9	0.99	16.9**	5.56	SS13-19-3
Cobalt	30	6/8	0.99	5.3	2.35	SS13-19-3
Copper	25	8/8	0.90	10.4	5.41	SS13-19-3
Iron	2,000	8/8	1,440	18,100	6,536	SS13-19-3
Lead	500	9/9	0.51	7.4	2.07	BS-BK4-04
Magnesium	-	8/8	344	11,300	2,396	BS-BK4-04
Manganese	-	8/8	13.2	243	82.2	BS-BK4-04
Mercury	0.1	0/9	ND	ND	ND	ND
Nickel	13	5/8	2.6	12.5	5.78	SS13-19-3
Potassium	-	7/8	128	1,190	439	SS13-19-3
Selenium	2	0/9	ND	ND	ND	ND
Silver	-	0/9	ND	ND	ND	ND
Sodium	-	6/8	35.5	119	60.13	SS13-19-3
Thallium	-	0/8	ND	ND	ND	ND
Vanadium	150	6/8	2.6	24.2	10.87	SS13-19-3
Zinc	20	8/8	4.6	32.2	13.08	SS13-19-3
Cyanide	-	0/3	ND	ND	ND	ND

All results reported in mg/kg.

Samples used for background subsurface soil include BS-BK2-04, BS-BK1-05, BS-BK4-04, BS-BK3-06, BS-BK6-06, SS10-08-3, SS10-09-3, SS04-029-3 and SS13-19-3.

*TBC To Be Considered

(-) No TBC available.

**Maximum value obtained from duplicate sample.

ND - Not detected.

Source for BS sample series: Malcolm Pirnie, 1993.

- Exceeds TBC

TABLE 3-6

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION DETECTED ANALYTES IN SUBSURFACE SOILS BENEATH PAVEMENT

ANALYTE	*TBC VALUE	FREQUENCY OF DETECTION	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	AVERAGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION
Methylene Chloride	100	1/7	4	4	4	SB10-03-4
Acetone	200	3/7	97	1,000	412	SB10-01-2
Carbon Disulfide	2,700	1/7	1	1	1	MWPH10-03-0
1,1-Dichloroethene	400	1/7	620	620	620	SB10-01-2
2-Butanone	300	2/7	16	51	33.5	SB10-03-4
Ethylbenzene	5,500	3/7	15	6,500	2,258	SB10-03-0
Xylene (total)	1,200	6/7	92	40,000	9,419	SB10-03-0
Naphthalene	13,000	6/7	430	20,000	4,735	SB10-03-0
2-Methylnaphthalene	36,400	6/7	210	31,000	9,102	SB10-03-0
Acenaphthene	50,000	2/7	86	190	138	SB10-01-0-R
Dibenzofuran	6,200	1/7	46	46	46	SB10-01-0-R
Fluorene	50,000	2/7	160	450	305	SB10-01-0-R
Phenanthrene	50,000	3/7	33	140	91	MW10-02-1
Fluoranthene	50,000	2/7	11	120	65.5	MW10-02-1
Pyrene	50,000	2/7	29	47	38	MW10-02-1
Benzo(a)anthracene	224	1/7	30	30	30	MW10-02-1
Chrysene	400	1/7	74	74	74	MW10-02-1
Endosulfan II	900	2/7	4.8	9.6	7.2	SB10-03-0
Endosulfan sulfate	1,000	2/7	1.7	9.2	5.5	SB10-03-0
Aroclor-1260	10,000	1/7	21	21	21	SB10-01-2
Aluminum (mg/kg)	-	2/7	1,450	1,870	1,660	SB10-03-0
Arsenic (mg/kg)	7.5	1/7	0.72	0.72	0.72	SB10-03-0
Barium (mg/kg)	300	2/7	7	10.1	8.55	SB10-03-0
Calcium (mg/kg)	-	2/7	2,650	16,100	9,375	SB10-03-0
Chromium (mg/kg)	10	2/7	2.8	4.1	3.5	SB10-03-0
Cobalt (mg/kg)	30	1/7	1.1	1.1	1.1	SB10-03-0
Copper (mg/kg)	25	2/7	1.2	3.1	2.1	SB10-03-0
Iron (mg/kg)	2,000	2/7	3,070	3,940	3,505	SB10-03-0
Lead (mg/kg)	500	2/7	1.6	2.9	2.3	SB10-03-0
Magnesium (mg/kg)	-	2/7	697	2,600	1,648.5	SB10-03-0
Manganese (mg/kg)	-	2/7	21.7	74	47.9	SB10-03-0
Nickel (mg/kg)	13	1/7	3.3	3.3	3.3	SB10-03-0
Sodium (mg/kg)	-	2/7	30.2	32.6	31.4	SB10-01-2
Vanadium (mg/kg)	150	2/7	6.4	6.8	6.6	SB10-01-2
Zinc (mg/kg)	20	2/7	11.4	23.2	17.3	SB10-03-0

Results reported in µg/kg unless otherwise noted.

*TBC To Be Considered

(-) No TBC available.

- Exceeds TBC

TABLE 3-7

HEAVY EQUIPMENT MAINTENANCE FACILITY (SS-010) - REMEDIAL INVESTIGATION DETECTED ANALYTES IN SUBSURFACE SOILS FROM UNPAVED AREAS

ANALYTE	*TBC VALUE	FREQUENCY OF DETECTION	MINIMUM DETECTED CONCENTRATION	MAXIMUM DETECTED CONCENTRATION	AVERAGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION
2-Butanone	300	1/2	120	120	120	SB10-02-0
Ethylbenzene	5,500	1/2	460	460	460	SB10-02-0
Xylene (total)	1,200	1/2	1,900	1,900	1,900	SB10-02-0
Naphthalene	13,000	2/2	18	2,400	1,209	SB10-02-0-R
2-Methylnaphthalene	36,400	2/2	24	3,900	1,962	SB10-02-0-R
Dimethylphthalate	2,000	1/2	5	5	5	SB10-02-2-R
Acenaphthene	50,000	1/2	150	150**	150	SB10-02-0-R
Diethylphthalate	7,100	1/2	45	45	45	SB10-02-2-R
Fluorene	50,000	1/2	300	300	300	SB10-02-2-R
Phenanthrene	50,000	2/2	5	590	298	SB10-02-0-R
Anthracene	50,000	1/2	160	160	160	SB10-02-0-R
Fluoranthene	50,000	1/2	490	490	490	SB10-02-0-R
Pyrene	50,000	2/2	5	460	233	SB10-02-0-R
Benzo(a)anthracene	224	1/2	160	160	160	SB10-02-0-R
Chrysene	400	1/2	170	170	170	SB10-02-0-R
bis(2-Ethylhexyl)phthalate	50,000	1/2	170	170	170	SB10-02-0-R
Di-n-octyl phthalate	50,000	1/2	3	3	3	SB10-02-2-R
Benzo(b)fluoranthene	1,100	1/2	130	130	130	SB10-02-0-R
Benzo(k)fluoranthene	1,100	1/2	100	100	100	SB10-02-0-R
Benzo(a)pyrene	61	1/2	120	120	120	SB10-02-0-R
4,4'-DDE	2,100	1/2	0.98	0.98	0.98	SB10-02-0
4,4'-DDD	2,900	1/2	8.7	8.7	8.7	SB10-02-0
Endosulfan sulfate	1,000	1/2	1.2	1.2	1.2	SB10-02-0
4,4'-DDT	2,100	1/2	0.87	0.87	0.87	SB10-02-0
Methoxychlor	10,000	1/2	2.1	2.1	2.1	SB10-02-0
Endrin aldehyde	—	1/2	1.2	1.2	1.2	SB10-02-0
Aroclor-1254	10,000	1/2	26	26	26	SB10-02-0
Aroclor-1260	10,000	1/2	42	42	42	SB10-02-0
Aluminum (mg/kg)	—	1/2	2,350	2,350**	2,350	SB10-02-0
Antimony (mg/kg)	—	1/2	5.3	5.3**	5.3	SB10-02-0
Arsenic (mg/kg)	7.5	1/2	1.7	1.7	1.7	SB10-02-0
Barium (mg/kg)	300	1/2	12.9	12.9**	12.9	SB10-02-0
Calcium (mg/kg)	—	1/2	7,010	7,010**	7,010	SB10-03-0
Chromium (mg/kg)	10	1/2	6.1	6.1**	6.1	SB10-02-0
Cobalt (mg/kg)	30	1/2	1.5	1.5	1.5	SB10-02-0
Copper (mg/kg)	25	1/2	14.2	14.2**	14.2	SB10-02-0
Iron (mg/kg)	2,000	1/2	7,190	7,190	7,190	SB10-02-0
Lead (mg/kg)	500	1/2	26.4	26.4**	26.4	SB10-02-0
Magnesium (mg/kg)	—	1/2	1,690	1,690**	1,690	SB10-03-0
Manganese (mg/kg)	—	1/2	112	112**	112	SB10-02-0
Nickel (mg/kg)	13	1/2	2.60	2.60	2.60	SB10-03-0
Sodium (mg/kg)	—	1/2	41.0	41.0**	41.0	SB10-02-0
Vanadium (mg/kg)	150	1/2	15.8	15.8	15.8	SB10-02-0
Zinc (mg/kg)	20	1/2	38.9	38.9	38.9	SB10-02-0

Results reported in µg/kg unless otherwise noted.
*TBC To Be Considered
— - No TBC available.
**Maximum value obtained from duplicate sample.
- Exceeds TBC.

TABLE 3-8
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL GAS SCREENING SURVEY RESULTS

SAMPLE I.D.	COMPOUND DETECTED	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)
A-1	Toluene	108	ppb	1.5
A-2	Toluene	60.2	ppb	1.5
A-3	Toluene	110	ppb	0.5
A-7	Toluene	120	ppb	0.5
A-7	Xylene	60	ppb	0.5
A-9	Toluene	110	ppb	0.5
A-10	Benzene	160500	ppb	1
A-10	Toluene	505000	ppb	1
A-10	Trichloroethylene	780000	ppb	1
A-10	Tetrachloroethene	29350	ppb	1
A-11	Toluene	109	ppb	1.5
A-14	Toluene	75	ppb	1
A-16	Toluene	72	ppb	1
B-1	Toluene	70.5	ppb	1.5
B-2	Toluene	93	ppb	1.5
B-6	Tetrachloroethene	137	ppb	1
B-7	Toluene	79	ppb	1
B-14	Toluene	127	ppb	1.5
B-16	Toluene	97	ppb	1.5
B-18	Ethylbenzene	725	ppb	1.5
C-8	Benzene	27800	ppb	1.5
C-8	Toluene	51800	ppb	1.5
C-8	Xylene	804000	ppb	1.5
C-8	Trichloroethylene	356	ppb	1.5

TABLE 3-8 (CONT'D)
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL GAS SCREENING SURVEY RESULTS

SAMPLE I.D.	COMPOUND DETECTED	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)
C-11	Benzene	103	ppb	1.5
C-11	Toluene	680000	ppb	1.5
C-11	Ethylbenzene	72000	ppb	1.5
C-11	Xylene	827	ppb	1.5
C-11	Trichloroethylene	216000	ppb	1.5
C-12	Benzene	4490	ppb	1.5
C-12	Toluene	204	ppb	1.5
C-12	Trichloroethylene	7100	ppb	1.5
C-12	Tetrachloroethene	7480	ppb	1.5
C-13	Toluene	27	ppb	1.5
C-14	Toluene	32	ppb	1.5
C-14	Xylene	181	ppb	1.5
C-15	Toluene	1171	ppb	1.75
C-15	Ethylbenzene	1334	ppb	1.75
C-15	Xylene	712	ppb	1.75
C-15	Trichloroethylene	222	ppb	1.75
C-15	Tetrachloroethene	195	ppb	1.75
C-16	Toluene	119	ppb	2
C-17	Toluene	89	ppb	2
C-17	Xylene	219	ppb	2
C-18	Toluene	74	ppb	2
D-1	Toluene	99	ppb	0.5
D-3	Trichloroethylene	20	ppb	1
D-6	Toluene	42	ppb	1.5
D-8	Benzene	10	ppb	1.5
D-8	Toluene	92	ppb	1.5
D-8	Xylene	284	ppb	1.5
D-10	Ethylbenzene	4600	ppb	1.5

TABLE 3-8 (CONT'D)
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL GAS SCREENING SURVEY RESULTS

SAMPLE I.D.	COMPOUND DETECTED	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)
D-13	Benzene	180000	ppb	1.75
D-13	Toluene	417000	ppb	1.75
D-13	Ethylbenzene	88500	ppb	1.75
D-13	Xylene	175250	ppb	1.75
D-13	Trichloroethylene	213000	ppb	1.75
D-14	Toluene	78	ppb	1.5
D-15	Benzene	509	ppb	1.75
D-15	Toluene	14170	ppb	1.75
D-15	Ethylbenzene	76	ppb	1.75
D-15	Xylene	645	ppb	1.75
D-15	Tetrachloroethene	172	ppb	1.75
D-16	Benzene	721	ppb	2
D-16	Toluene	16050	ppb	2
D-16	Ethylbenzene	175	ppb	2
D-16	Xylene	674	ppb	2
D-16	Trichloroethylene	1107	ppb	2
D-17	Toluene	65	ppb	2
E-6	Benzene	188	ppb	0.5
E-8	Toluene	44	ppb	1.5
E-8	Ethylbenzene	771	ppb	1.5
E-8	Xylene	257	ppb	1.5
E-10	Ethylbenzene	985	ppb	1.5
E-13	Toluene	98	ppb	1.75
E-14	Toluene	115	ppb	1.5
E-15	Toluene	112	ppb	1.5
E-15	Xylene	144	ppb	1.5
E-16	Toluene	94	ppb	2
E-16	Xylene	206	ppb	2

TABLE 3-8 (CONT'D)
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL GAS SCREENING SURVEY RESULTS

SAMPLE I.D.	COMPOUND DETECTED	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)
F-1	Toluene	73	ppb	0.5
F-6	Toluene	56	ppb	1.5
F-10	Toluene	94.2	ppb	1.5
F-15	Toluene	91	ppb	1.5
F-15	Xylene	45	ppb	1.5
F-18	Toluene	76	ppb	1.25

TABLE 3-9
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL SAMPLE RESULTS

SAMPLE I.D.	ANALYSIS	COMPOUND DETECTED	TAGM 4046 LIMIT	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)	PID READING (ppm)
10-SS-01	TCL VOC	Methylene Chloride	1	52 B	ug/kg	4-5.5	0.7
10-SS-02	TCL VOC	Methylene Chloride	1	44 B	ug/kg	4-5.5	0.5
10-SS-03	TCL VOC	Methylene Chloride	1	19 B	ug/kg	3-4	10
10-SS-04	TCL VOC	Methylene Chloride	1	44 B	ug/kg	3-4	1
10-SS-05	TCL VOC	Methylene Chloride	1	43 B	ug/kg	3-4	1.1
10-SS-06	TCL VOC	Methylene Chloride	1	53 B	ug/kg	2.5-4	1.7
10-SS-06	TCL BNA	4-Methylphenol	9	570 J	ug/kg	2.5-4	1.7
10-SS-07	TCL VOC	Methylene Chloride	1	43 B	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Acenaphthalene	900	1140 J	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Benzo(a)anthracene	30	4050	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Benzo(a)pyrene	61	3650	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Benzo(b)fluoranthene	11	3470	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Benzo(k)fluoranthene	11	3350	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Chrysene	4	4230	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Dibenzofuran	62	501 J	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Dibenzo(a,h)anthracene	14	374 J	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Indeno(1,2,3-cd)pyrene	32	1750	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Phenanthrene	2200	7770	ug/kg	0.5-2	1.2
10-SS-07	TCL BNA	Pyrene	6650	7340	ug/kg	0.5-2	1.2
10-SS-08	TCL VOC	Methylene Chloride	1	59 B	ug/kg	2-3.5	0.2
10-SS-09	TCL VOC	Ethylbenzene	55	93 JB	ug/kg	1-3	1900
10-SS-09	TCL VOC	Methylene Chloride	1	640 B	ug/kg	1-3	1900
10-SS-09	TCL VOC	Naphthalene	130	2100	ug/kg	1-3	1900
10-SS-09	TCL VOC	Toluene	15	510	ug/kg	1-3	1900
10-SS-09	TCL VOC	Xylenes, total	12	5800	ug/kg	1-3	1900
10-SS-09	TCL VOC	Total VOCs	10000	34243	ug/kg	1-3	1900
10-SS-09	TCL BNA	2-Methylnaphthalene	364	3010	ug/kg	1-3	1900
10-SS-09	TCL BNA	Naphthalene	130	1880	ug/kg	1-3	1900
10-SS-10	TCL VOC	Methylene Chloride	1	64 B	ug/kg	1-3	1
10-SS-11	TCL VOC	Methylene Chloride	1	86	ug/kg	1-2.5	1
10-SS-11	TCL BNA	Dibenzo(a,h)anthracene	14	74.7	ug/kg	1-2.5	1
10-SS-11	TCL BNA	Indeno(1,2,3-cd)pyrene	32	67.9	ug/kg	1-2.5	1
10-SS-12	TCL VOC	Methylene Chloride	1	58 B	ug/kg	1-2.5	1
10-SS-13	TCL VOC	Methylene Chloride	1	55 B	ug/kg	1-3	0
10-SS-14	TCL VOC	Methylene Chloride	1	20.3	ug/kg	1-2	50

TABLE 3-9 (CONT'D)
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL SAMPLE RESULTS

SAMPLE I.D.	ANALYSIS	COMPOUND DETECTED	TAGM 4046 LIMIT	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)	PID READING (ppm)
10-SS-14	TCL VOC	Trichloroethylene	7	7	ug/kg	1-2	50
10-SS-14	TCL VOC	Xylenes, total	12	344	ug/kg	1-2	50
10-SS-14	TCL BNA	Di-n-butyl phthalate	81	154 J	ug/kg	1-2	50
10-SS-15	TCL VOC	Methylene Chloride	1	4.48 J	ug/kg	0.5-2	41
10-SS-15	TCL BNA	Di-n-butyl phthalate	81	101 J	ug/kg	0.5-2	41
10-SS-16	TCL VOC	Methylene Chloride	1	22.4	ug/kg	1-2	0.8
10-SS-16	TCL BNA	Di-n-butyl phthalate	81	145 J	ug/kg	1-2	0.8
10-SS-17	TCL VOC	Ethylbenzene	55	5170	ug/kg	0.5-2	1600
10-SS-17	TCL VOC	Methylene Chloride	1	743 J	ug/kg	0.5-2	1600
10-SS-17	TCL VOC	Naphthalene	130	2010	ug/kg	0.5-2	1600
10-SS-17	TCL VOC	Xylenes, total	12	5520	ug/kg	0.5-2	1600
10-SS-17	TCL VOC	Total VOCs	10000	26303	ug/kg	0.5-2	1600
10-SS-17	TCL BNA	2-Methylnaphthalene	364	20300	ug/kg	0.5-2	1600
10-SS-17	TCL BNA	Naphthalene	130	5160	ug/kg	0.5-2	1600
10-SS-18	TCL VOC	Methylene Chloride	1	3.22 J	ug/kg	0.5-3	350
10-SS-18	TCL BNA	Di-n-butyl phthalate	81	123 J	ug/kg	0.5-3	350
10-SS-19	TCL VOC	Methylene Chloride	1	3.6 J	ug/kg	0.5-3	100
10-SS-19	TCL BNA	Di-n-butyl phthalate	81	86.6 J	ug/kg	0.5-3	100
10-SS-20	TCL VOC	Methylene Chloride	1	5.64 J	ug/kg	0.5-3	0.4
10-SS-21	TCL VOC	Ethylbenzene	55	33300	ug/kg	0.5-3	1520
10-SS-21	TCL VOC	Methylene Chloride	1	2630 J	ug/kg	0.5-3	1520
10-SS-21	TCL VOC	Naphthalene	130	5420	ug/kg	0.5-3	1520
10-SS-21	TCL VOC	Trichloroethylene	7	3030	ug/kg	0.5-3	1520
10-SS-21	TCL VOC	Xylenes, total	12	20400	ug/kg	0.5-3	1520
10-SS-21	TCL VOC	Total VOCs	10000	138380	ug/kg	0.5-3	1520
10-SS-21	TCL BNA	2-Methylnaphthalene	364	4840	ug/kg	0.5-3	1520
10-SS-21	TCL BNA	Naphthalene	130	1770 J	ug/kg	0.5-3	1520
10-SS-22	TCL VOC	Methylene Chloride	1	6.76	ug/kg	2-3	0
10-SS-22	TCL VOC	Trichloroethylene	7	10.8	ug/kg	2-3	0
10-SS-23	TCL VOC	Ethylbenzene	55	1100	ug/kg	1.5-3	392
10-SS-23	TCL VOC	Methylene Chloride	1	2070 J	ug/kg	1.5-3	392
10-SS-23	TCL VOC	Naphthalene	130	2890	ug/kg	1.5-3	392
10-SS-23	TCL VOC	Trichloroethylene	7	8080	ug/kg	1.5-3	392
10-SS-23	TCL VOC	Total VOCs	10000	41170	ug/kg	1.5-3	392
10-SS-23	TCL BNA	2-Methylnaphthalene	364	3560	ug/kg	1.5-3	392
10-SS-23	TCL BNA	Naphthalene	130	917	ug/kg	1.5-3	392
10-SS-24	TCL VOC	Ethylbenzene	55	6700	ug/kg	1-3	1894

TABLE 3-9 (CONT'D)
SPILL SITE SS-010 DELINEATION INVESTIGATION
SOIL SAMPLE RESULTS

SAMPLE I.D.	ANALYSIS	COMPOUND DETECTED	TAGM 4046 LIMIT	REPORTED DETECTION	UNITS	SAMPLE DEPTH (ft. bgs)	PID READING (ppm)
10-SS-24	TCL VOC	Methylene Chloride	1	753 J	ug/kg	1-3	1894
10-SS-24	TCL VOC	Naphthalene	130	3640	ug/kg	1-3	1894
10-SS-24	TCL VOC	Xylenes, total	12	11000	ug/kg	1-3	1894
10-SS-24	TCL VOC	Total VOCs	10000	80183	ug/kg	1-3	1894
10-SS-24	TCL BNA	2-Methylnaphthalene	364	5040	ug/kg	1-3	1894
10-SS-24	TCL BNA	Naphthalene	130	2090	ug/kg	1-3	1894
10-SS-25	TCL VOC	Methylene Chloride	1	6.2	ug/kg	2-3.5	0.5
10-SS-26	TCL VOC	Methylene Chloride	1	6.7	ug/kg	2.5-3	0.3
10-SS-27	TCL VOC	Methylene Chloride	1	21.8	ug/kg	0.5-2	0
10-SS-28	TCL VOC	Methylene Chloride	1	9.96	ug/kg	2-3	0
10-SS-29	TCL VOC	Methylene Chloride	1	15	ug/kg	2-3	0
10-SS-30	TCL VOC	Methylene Chloride	1	6.66	ug/kg	2-3	0
10-SS-31	TCL VOC	Methylene Chloride	1	5.06	ug/kg	2-3.5	0
10-SS-32	TCL VOC	Methylene Chloride	1	6.87	ug/kg	2-3.5	0

B Compound also appeared in laboratory blank

J Concentration estimated due to matrix interference

TABLE 3-10

HEAVY EQUIPMENT MATERIAL FACILITY (SS-010) - REMEDIAL INVESTIGATION
DETECTED ANALYTES IN GROUNDWATER SAMPLES

ANALYTE	*ARAR VALUE	ROUND - 1					ROUND - 2				
		CONCENTRATION IN BACKGROUND WELL (MW-10-001)	TWO DOWNGRADIENT WELLS				CONCENTRATION IN BACKGROUND WELL (MW-10-001)	TWO DOWNGRADIENT WELLS			
			FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	AVERAGE OF DETECTIONS		FREQUENCY OF DETECTION	DETECTED MINIMUM CONCENTRATION	DETECTED MAXIMUM CONCENTRATION	AVERAGE OF DETECTIONS
Chloromethane	5	ND	ND	ND	ND	ND	13	2/2	18	18	18
Chloroethane	5	ND	ND	ND	ND	ND	ND	1/2	1.5	1.5	1.5
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	2/2	0.9	2.0	1.5
Acetone	50	ND	1/2	6	6	6	ND	1/2	30	30	30
Carbon Disulfide	50	ND	1/2	2	2	2	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND	ND	ND	6.4	2/2	2.8	6.3	4.5
Benzene	0.7	ND	ND	ND	ND	ND	ND	1/2	1.2	1.2	1.2
Xylene(total)	5	ND	1/2	6	6	6	ND	1/2	18	18	18
Naphtalene	10	ND	ND	ND	ND	ND	ND	1/2	1	1	1
Butylbenzylphtalate	50	ND	ND	ND	ND	ND	2	ND	ND	ND	ND
Bis(2-Ethylhexyl)phthalate	50	ND	ND	ND	ND	ND	ND	1/2	2	2	2
Aluminum (unfiltered)	—	15,500	2/2	487	1,270	879	19,500	2/2	315	3,160	1,738
Arsenic (unfiltered)	25	8.9	2/2	1.1	1.8	1.4	14.2	1/2	2.2	2.2	2.2
Barium (unfiltered)	1,000	78.8	2/2	18.0	21	19.5	88.8	2/2	17.1	24.9	21
Beryllium (unfiltered)	3	1.5	ND	ND	ND	ND	1.8	ND	ND	ND	ND
Cadmium (unfiltered)	10	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (unfiltered)	—	48,700	2/2	39,900	64,400	52,150	53,100	2/2	53,500	61,400	57,450
Chromium (unfiltered)	50	43.3	2/2	6.4	8	7.2	46	1/2	7.3	7.3	7.3
Cobalt (unfiltered)	-	26.6	2/2	ND	ND	ND	29.6	1/2	7.5	7.5	7.5
Copper (unfiltered)	200	40.4	2/2	3.4	4.2	3.8	45.9	2/2	4.1	12.4	8.25
Iron (unfiltered)	300	56,800	2/2	11,600	13,700	12,650	87,500	2/2	11,200	18,000	14,600
Lead (unfiltered)	15	9.6	1/2	1.6	1.6	ND	12.5	1/2	5.1	5.1	5.1
Magnesium (unfiltered)	35,000	28,100	2/2	11,000	13,400	12,200	30,000	2/2	14,300	14,400	14,350
Manganese (unfiltered)	300	871	2/2	482	514	498	882	2/2	460	587	524
Mercury (unfiltered)	2	ND	1/2	0.2	0.2	0.2	ND	ND	ND	ND	ND
Nickel (unfiltered)	—	31.7	1/2	4.6	4.6	4.6	41.5	1/2	10	10	10
Potassium (unfiltered)	—	4,460	2/2	1,300	2,000	1,650	7,330	1/2	5,050	5,050	5,050
Sodium (unfiltered)	20,000	4,300	2/2	13,600	1,440,000	726,800	5,640	2/2	10,800	14,000	12,300
Thallium (unfiltered)	4	ND	1/2	4.3	4.3	4.3	ND	ND	ND	ND	ND
Vanadium (unfiltered)	—	87.6	1/2	7.0	7	7	82.4	1/2	10.6	10.6	10.6
Zinc (unfiltered)	300	124	2/2	44	56.7	50.4	155	2/2	11.1	56.7	33.9
Cyanide (unfiltered)	—	ND	ND	ND	ND	ND	ND	1/2	11	11	11
Aluminum (filtered)	—	53.9	2/2	49.1	79.7	64.4	73.3	2/2	60.6	79.7	74.6
Arsenic (filtered)	25	ND	1/2	1.1	1.1	1.1	ND	ND	ND	ND	ND
Barium (filtered)	1,000	17.2	2/2	21.1	26.1	23.6	24.6	1/2	17.5	17.5	17.5
Calcium (filtered)	—	44,200	2/2	51,200	60,100	55,650	41,800	2/2	51,600	58,900	55,250
Chromium (filtered)	50	5	2/2	5.7	6.6	6.2	ND	ND	ND	ND	ND
Iron (filtered)	300	46.3	2/2	9,550	10,900	10,225	127	2/2	9,980	12,200	11,040
Lead (filtered)	15	ND	1/2	1	1	1	ND	ND	ND	ND	ND
Magnesium (filtered)	35,000	17,500	2/2	12,700	14,300	13,500	16,500	2/2	12,700	13,800	13,250
Manganese (filtered)	300	225	2/2	430	581	506	317	2/2	441	663	497
Nickel (filtered)	—	ND	1/2	8.4	8.4	8.4	ND	1/2	5.7	5.7	5.7
Potassium (filtered)	—	ND	1/2	1,600	1,800	1,800	ND	ND	ND	ND	ND
Sodium (filtered)	20,000	5140	2/2	12,600	15,200	13,900	7,850	2/2	11,300	13,500	12,400
Zinc (filtered)	300	18.8	2/2	20	31.9	26	37.3	2/2	13.1	21.6	17.4

All results reported in ug/l

*ARAR Applicable Relevant or Appropriate Requirements

— - No ARAR available

ND - Not Detected

SECTION 4

THREATS TO PUBLIC HEALTH, WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

4.1 THREATS TO PUBLIC HEALTH, WELFARE OR THE ENVIRONMENT

4.1.1 Hazard Identification

As reported previously in this document, environmental sampling has shown elevated levels of VOCs and SVOCs, specifically TCE, ethylbenzene, xylenes, benzo and dibenzo anthracenes, and benzo(a)pyrene. These chemical contaminants have been identified in soil samples collected from borings and Geoprobe® samples conducted at Site SS-010. Direct human contact with these contaminants is unlikely if the site is not disturbed.

For the purposes of this Action Memorandum, chemical contamination is discussed in the context of the potential for additional degradation of groundwater which may be used for public consumption. The potential for contamination to leach from soils into the groundwater is what has prompted this removal action. The fate and transport of contaminated groundwater and potential downgradient receptors are being considered as part of the ongoing groundwater investigation.

4.1.2 Description of Contaminants

For the purposes of this Action Memorandum, TCE, ethylbenzene, xylenes, benzo(a)anthracene, and benzo(a)pyrene have been chosen as the representative contaminants at this site, due to their toxicity, presence in the subsurface, and inclusion in NYSDEC TAGM HWR-94-4046. It is expected that remediation of Spill Site SS-010 vadose zone soils to the TAGM levels for these representative compounds will effectively remediate all contaminated soils at the site.

4.1.2.1 Toxicity

The primary references for toxicity data for all compounds included:

- USEPA, 1994. Integrated Risk Information System (IRIS). On-line data base. March.
- USEPA, 1994a. Health Effects Assessment Summary Tables (HEAST). Office of Emergency and Remedial Response. March.

Additional references for TCE toxicity included:

- ATSDR, 1988. Toxicological Profile for Trichloroethylene, Draft. Agency for Toxic Substances and Disease Registry. USPHS/USEPA. January.
- USEPA, 1994b. Personal communication from M. Cowles of USEPA to K. Scruton of Parsons Engineering Science, Inc. Environmental Criteria Assessment Office, Chemical Mixtures Assessment Branch. 13 October, 1994.

Trichloroethene: TCE has anesthetic properties, and inhalation of high concentrations causes unconsciousness in humans. Links to cancer and birth defects in humans are uncertain. Neither IRIS nor HEAST currently provide toxicity values for TCE. The USEPA has not resolved the weight-of-evidence classification of TCE, and currently places it in either Group C (possible human carcinogen) or Group 2 (probable human carcinogen). It has also been described as being on a Group "C-B2" continuum.

Ethylbenzene: Humans exposed to ethylbenzene may experience eye and throat irritation, decreased movement, and dizziness. Studies in animals have shown liver and kidney damage, nervous system changes, and blood changes. The USEPA has placed xylenes in weight-of-evidence Group D, indicating that it is not classifiable as a human carcinogen.

Xylenes: The primary target of xylenes toxicity is the central nervous system. Xylenes are considered to be nongenotoxic. The USEPA has placed xylenes in weight-of-evidence Group D, indicating that they are not classifiable as human carcinogens.

Benzo(a)anthracene and Benzo(a)pyrene: In general ingestion, inhalation, and dermal contact with high molecular weight PAHs including benzo(a)anthracene and benzo(a)pyrene have been shown to produce tumors in laboratory animals. Reports in humans show that individuals exposed by inhalation or dermal contact for long periods to mixtures of PAHs can develop cancer. However, the relationship of exposure to any individual PAH with the onset of cancer is unclear. The USEPA has placed both benzo(a)anthracene and benzo(a)pyrene in weight-of-evidence Group B2, indicating that they are probable human carcinogens

4.1.2.2 Fate and Transport

The primary reference for the fate and transport information was:

- Howard, P.H., 1990. Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Vol. II: Solvents. Lewis Publishers, Inc. Chelsea, Michigan.

Trichloroethene: TCE released to soil will partially evaporate and partially leach to the groundwater, where it may remain for a long time. It is highly mobile in soils, where there is some degradation to other chlorinated alkenes. Since it is only somewhat soluble in water and substantially denser, when it occurs as a separate phase it tends to sink to the bottom of the aquifer. However, no separate phase hydrocarbons have ever been found at Site SS-010. Significant biodegradation can take place when TCE is cometabolized in the presence of BTEX compounds. Cometabolic degradation means that TCE is biodegraded concurrently with BTEX compounds by microorganism that utilize BTEX compounds as their primary carbon source. Enzymes and/or cofactors produced by the microorganisms act on the TCE rendering it bioavailable for the microorganisms (Wilson, et. al., 1985, Little, et. al., 1988, Fox, et. al., 1990).

Evaporation is the primary removal mechanism in surface water. Biodegradation, hydrolysis, and photooxidation are extremely slow by comparison. Adsorption to sediment and bioconcentration in aquatic organisms are insignificant. TCE in the atmosphere will be present in the vapor phase and is rapidly degraded.

Ethylbenzene: Ethylbenzene release to surface soils will probably undergo partial volatilization and, given its limited ability to sorb to soils (K_{OC} = 871), leach to groundwater. Evidence suggests that this material undergoes biodegradation in groundwaters, and may do so in soils if the initial loading does not prove toxic to soil-based microorganisms. If released to surface waters, ethylbenzene is expected to volatilize fairly readily. As with groundwaters, rapid biodegradation can be predicted after an initial acclimation period. Ethylbenzene shows only a slight to moderate tendency to adsorb to soils and sediments in waters. Bioconcentration in aquatic organisms is not expected to be significant (bioconcentration factor for ethylbenzene = 145). Ethylbenzene is expected to exist in the atmosphere primarily as a vapor based on its vapor pressure (9.53 mm Hg). Principally, ethylbenzene will be removed from the atmosphere via reaction with hydroxyl radicals; some washout with rainfall may be expected.

Xylenes: Xylenes are moderately mobile in soil and may leach to groundwater where they are known to persist for several years despite evidence of biodegradation in both soil and groundwater. The dominant removal process in surface water is volatilization, but this is not a rapid process. Some adsorption to sediment will occur. Once released to the atmosphere, xylenes will undergo photochemical degradation at a moderate rate.

Benzo(a)anthracene and Benzo(a)pyrene: In general, high molecular weight PAHs including benzo(a)anthracene and benzo(a)pyrene adsorb to soil particles and resist movement through soil. The primary removal mechanism for high molecular weight PAHs in soils is biodegradation. PAHs in surface water are removed by volatilization, binding to particles and sediments, bioaccumulation, and sorption onto aquatic biota. Half-lives for benzo(a)anthracene and benzo(a)pyrene have been estimated to be greater than 100 hours. High molecular weight PAHs present in the atmosphere are generally sorbed to particles and may be transported great distances by the wind. They are subject to photodegradation as well as wet or dry deposition.

4.1.3 Contaminant Action Levels

At the present time, there are no federal standards for soil cleanup. Therefore, other criteria must be used to evaluate site contamination. The NYSDEC Division of Hazardous Waste Remediation has issued a Technical and Administrative Guidance Memorandum (HWR-94-4046), titled "Determination of Soil Cleanup Objectives and Cleanup Levels" (TAGM 4046), January 24, 1994. Cleanup of the vadose zone soils at Spill Site SS-010 at Plattsburgh AFB will be considered complete when the recommended cleanup levels as specified under NYSDEC TAGM HWR-94-4046 are met.

The recommended maximum allowable soil concentrations for the major organic contaminants found at Site SS-010 as specified under NYSDEC TAGM HWR-94-4046 are as follows:

4.1.3.1 Trichloroethene (RCO = 7 μg/kg)

Trichloroethene was detected during the 1996 Delineation Investigation at a maximum concentration of 8,080 μg/kg at Geoprobe® location 10-SS-23. This value

exceeds the 7 μg/kg allowable contaminant concentration in the soil as provided in TAGM 4046.

4.1.3.2 Ethylbenzene (RCO = 55 μg/kg)

Ethylbenzene was detected during the 1996 Delineation Investigation at a maximum concentration of 33,300 μg/kg at Geoprobe® location 10-SS-21. This value exceeds the 55 μg/kg allowable contaminant concentration in the soil as provided in TAGM 4046.

4.1.3.3 Xylenes (RCO = 12 μg/kg)

Total xylenes was detected during the 1996 Delineation Investigation at a maximum concentration of 20,400 μg/kg at Geoprobe® location 10-SS-21. This value exceeds the 12 μg/kg allowable contaminant concentration in the soil as provided in TAGM 4046.

4.1.3.4 Benzo(a)anthracene (RCO = 30 μg/kg)

Benzo(a)anthracene was detected during the 1996 Delineation Investigation at a maximum concentration of 4,050 μg/kg at Geoprobe® location 10-SS-07. This value exceeds the 30 μg/kg allowable contaminant concentration in soil provided in TAGM 4046.

4.1.3.5 Benzo(a)pyrene (RCO = 110 μg/kg)

Benzo(a)pyrene was detected during the 1996 Delineation Investigation at a maximum concentration of 3,650 μg/kg at Geoprobe® location 10-SS-07. This value exceeds the 110 μg/kg allowable concentration as provided in TAGM 4046.

4.1.3.6 Total Volatile Organic Compounds

TAGM 4046 limits soil cleanup objectives for total VOCs to less than or equal to 10 mg/kg (10,000 μg/kg). Total VOCs were detected during the 1996 Delineation Investigation above this limit at five locations (i.e. Geoprobe® locations 10-SS-09, 17, 21, 23, and 24).

4.1.4 Conclusions

Previous field investigations at Spill Site SS-010 indicate elevated levels of certain VOC and SVOC compounds. The soil cleanup objectives for selected VOCs in TAGM 4046 are based on protection of groundwater. Comparing the various VOC and SVOC concentrations detected in site soil samples to these objectives indicates that there is a potential for several of the VOCs and SVOCs present at Site SS-010 to eventually leach into the groundwater at concentrations that would exceed the NYSDEC groundwater and New York State Department of Health drinking water standards.

The samples collected at Site SS-010 during the 1996 Delineation Investigation were analyzed for VOCs and SVOCs. The cleanup levels for Site SS-010 have been based on the most frequently detected VOCs (i.e. TCE, ethylbenzene, and xylenes) and selected SVOCs (i.e. benzo(a)anthracene and benzo(a)pyrene). It is anticipated that remediation for these compounds will effectively remove other VOCs and SVOCs.

SECTION 5

ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment. If this removal action is not implemented, there is a potential for the contaminants to leach through the soil, reach the groundwater and migrate off-site. This may increase the potential for contact with off-site receptors, through the use of contaminated groundwater as a potable water source. The intention of the proposed action is to remedy the potential for release of contaminants to the local groundwater and the possible migration of the contamination off-site.

SECTION 6

PROPOSED REMOVAL ACTION AND ESTIMATED COSTS

6.1 PROPOSED REMOVAL ACTION

6.1.1 Overview

The preferred removal action alternative addresses the principle threat of Spill Site SS-010 by addressing VOCs and SVOCs present in vadose zone soils. The preferred alternative for Site SS-010 vadose zone soils is based on available site information and will follow the Presumptive Remedy Approach (EPA 540-F-93-048). The preferred removal action at Spill Site SS-010 will include two scenarios which are based on the constituent contaminants. The types of contaminated soil identified at Spill Site SS-010 are (1) soil containing primarily fuel-related compounds with low levels of trichloroethene (TCE), and (2) soils containing only fuel-related compounds. Based on the two soil contaminant types, the two remedial scenarios include:

- For soils that contain TCE above 0.5 mg/l as determined by the Toxicity Characteristic Leaching Procedure (TCLP), the soil will be excavated and treated off-site to remove the TCE via thermal desorption at a licensed New York State treatment facility. The thermally treated soil will be disposed of in a New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (USEPA) licensed treatment, storage or disposal (TSD) facility.
- For soils that do not contain TCE above 0.5 mg/l as determined by TCLP, the soil will be excavated and treated separately at the base landfarm operation that will be located at the former Alert Area on the flightline. Once treatment of the soil is complete (i.e. meets NYSDEC TAGM HWR-94-4046), the soil will be used as fill material within the former base boundaries.

Under both scenarios, excavation and remediation of the vadose zone soils at Spill Site SS-010 at Plattsburgh AFB will be considered complete when the recommended cleanup levels as specified under NYSDEC TAGM HWR-94-4046 are met at the excavation limits. Post excavation confirmatory sampling will be conducted to confirm that the cleanup objectives have been met. It is anticipated that the confirmatory sampling will include the collection of one sample every 50 feet along the excavation limits for analysis of target analytes (i.e. TCE, ethylbenzene, xylenes, benzo(a)anthracene, and benzo(a)pyrene). These target analytes were selected based on the results of previous site investigations and the recently completed delineation investigation.

6.1.2 Treatment Area

The site soils will be remediated according to TAGM 4046. These cleanup objectives are outlined in Section 4 of this document. The data obtained from pre-SI field investigations, the RI, and the Delineation Investigation indicates that measured

concentrations of TCE, ethylbenzene, xylenes, benzo(a)anthracene and benzo(a)pyrene are limited to two areas within Site SS-010.

6.1.3 Detailed Description

The soil in the shaded areas shown on Figure 6-1 will be excavated to the top of the existing groundwater encountered during the proposed removal action. The asphalt pavement removed from the excavation areas will be disposed of in a New York State approved construction and demolition debris landfill. The limits shown on Figure 6-1 are approximate, and it is proposed that excavation proceed until the TAGM RCOs as listed in Section 4 of this document are reached. Confirmatory sampling will be conducted during the excavation activities. It is proposed that confirmatory samples be collected only after background levels in the excavation side walls are measured with field instruments (i.e. photoionization detector and field analysis kits for PAHs). Confirmatory samples will be collected at a rate of one sample per every 50 feet of excavation side wall. The samples will be analyzed on a 48-hour turnaround basis to expedite the removal action. Once the RCOs have been reached at the excavation side walls, excavation will be discontinued, and the excavation backfilled with clean fill from an Air Force Base Conversion Agency (AFBCA) approved borrow pit, and the site repaved to match pre-removal action conditions.

Soils excavated from the site will be disposed of by two methods depending on the type of contaminants contained in the soil. Soils that contain TCE above 0.5 mg/l by TCLP will be treated off-site to remove the TCE via thermal desorption at a licensed NYSDEC treatment facility. The thermally treated soil will be disposed of in a NYSDEC and USEPA licensed TSD facility. Soils that do not contain TCE above 0.5 mg/l by TCLP will be treated separately at the base landfarm operation which will be located at the former Alert Area on the base flightline. Once treatment of this soil type is complete (as specified in the Landfarm Operation Memorandum), the soil will be used as fill material within the former base boundaries.

6.1.4 Disposal of Waste

The waste materials generated during the remediation of Spill Site SS-010 will be disposed on as described in Section 6.1.3 Detailed Description.

6.1.5 Contribution to Remedial Performance

The proposed action is being implemented to remediate contaminated soils and prevent contaminants from reaching the groundwater. The main objective of the remedial action is to remediate the soils containing TCE, ethylbenzene, xylenes, benzo(a)anthracene, benzo(a)pyrene and other VOCs and SVOCs.

6.1.6 Description of Alternative Technologies

The proposed removal action is "time critical" and does not require the preparation of an Engineering Evaluation/Cost Analysis (EE/CA) or a review of alternative technologies. This remedial technology was selected using the USEPA's Presumptive Remedy Approach for soils contaminated with VOCs and SVOCs (EPA-540-F-93-048).

6.1.7 Engineering Evaluation/Cost Analysis (EE/CA)

An engineers evaluation and cost analysis was not performed for this site. "Time critical" removal actions do not require preparation of an EE/CA.

6.1.8 Applicable or Relevant and Appropriate Requirements (ARARs)

6.1.8.1 General

All ARARs will be strictly adhered to during the removal action. The following ARARs have been identified for this removal action:

- Standards Applicable to Generators of Hazardous Waste (Title 40, Section 262, Code of Federal Regulations).
- Contingency Plan and Emergency Procedures (Title 40, Section 264, Subpart D, Code of Federal Regulations).
- General Facility Standards and Operations (Title 40, Section 264, Code of Federal Regulations).
- Hazardous Materials Regulations (Title 29, Section 1910, Code of Federal Regulations).
- Health and Safety Program (Title 29, Section 1910, Code of Federal Regulations).
- NYSDEC Hazardous Waste Management Regulations (Title 6, NYCRR, Part 373).
- (Title 49, Parts 171 through 179, Code of Federal Regulations).
- TAGM HWR-94-4046 Determination of Soil Cleanup Objectives and Cleanup Levels (Revised) January 24, 1994.
- NYSDEC Air Regulations (Title 6, NYCRR Part 200).
- NYSDEC Air Regulations (Title 6, NYCRR Part 201).
- NYSDEC Air Regulations (Title 6, NYCRR Part 211).
- NYSDEC Air Regulations (Title 6, NYCRR Part 212).
- NYSDEC Air Regulations (Title 6, NYCRR Part 257).
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants.

6.1.8.2 Removal Action

The National Oil and Hazardous Substance Pollution Contingency Plan (NCP) Section 300.415 lists eight factors which shall be considered in determining the appropriateness of a removal action. The following factors apply to Spill Site SS-010:

- Actual or potential exposure to nearby human populations, animal, or the food chain from hazardous substances or pollutants or contaminants;
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate; and

- Other situations or factors that may pose threats to the public health or welfare or the environment (i.e., the possibility for groundwater contamination).

The following factors do not apply to Spill Site SS-010:

- Actual or potential contamination of drinking water supplies or sensitive ecosystems; groundwater is not currently used as a potable water source, and sensitive ecosystems are not in danger;
- Hazardous substances or pollutants in drums, barrels, tanks, or other bulk storage containers that pose a threat of release; all bulk storage containers have been removed;
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released do not exist at the site;
- Threat of fire or explosion does not exist at the site; and
- The availability of other appropriate federal or state response mechanisms to respond to the release do not exist at this site.

6.1.9 Project Schedule

"Time critical" removal actions require that a planning period of less than six months exists before on-site activities are initiated. The six month planning period begins with the receipt of the Final Action Memorandum for Spill Site SS-010 by the USEPA and NYSDEC. To meet time objectives, the following schedule is proposed:

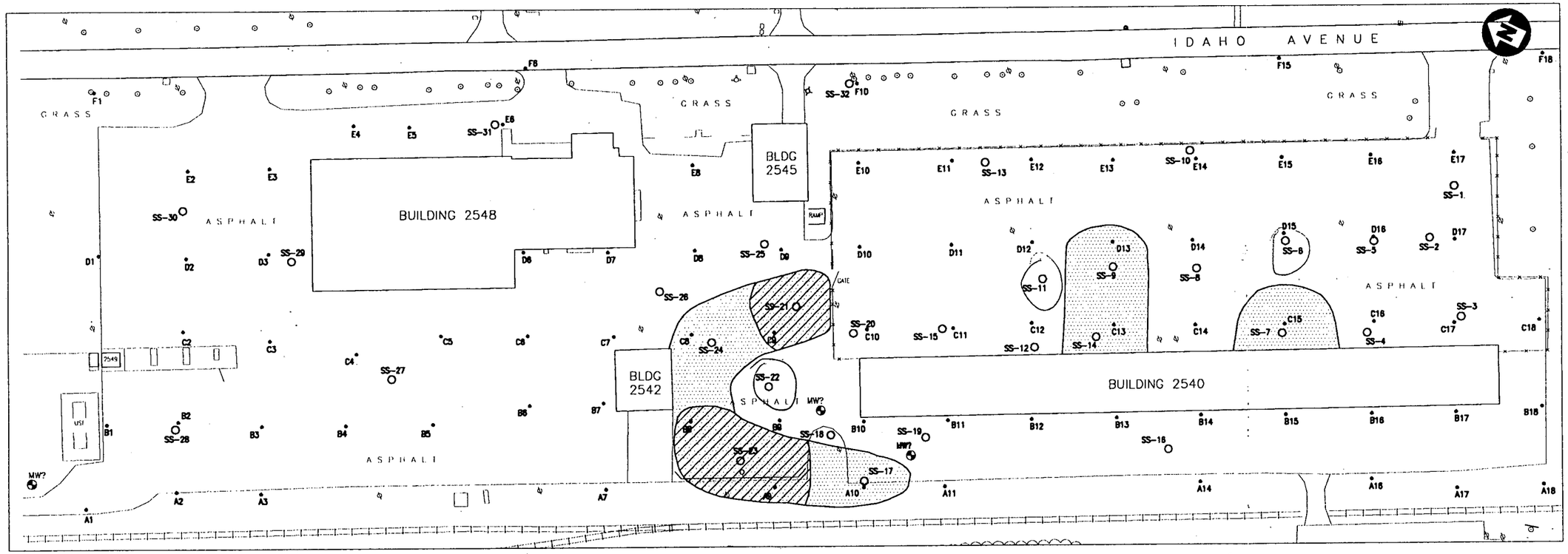
• September 1996	Submit Action Memorandum to USEPA and NYSDEC.
• October 1996	Begin and complete excavation and disposal of all Spill Site SS-010 contaminated soils and replace asphalt pavement.
• January 1997	Submit Draft Closure Report to NYSDEC and USEPA.
• March 1997	Submit Final Closure Report to NYSDEC and USEPA.

6.2 ESTIMATED COSTS

A preliminary cost estimate has been prepared based on the following assumptions:

- The maximum area to be remediated is as shown on Figure 6-1.
- The maximum tonnage of soil requiring off-site thermal treatment is 1,500 tons.
- The work will be done by one prime contractor who may subcontract some work items.

The total estimated cost for the removal action is between $100,000 and $500,000.



100' 50' 0 100'

Approximate Scale in Feet

LEGEND:

- A7 — SOIL VAPOR SAMPLE LOCATION
- SS-27 — SOIL SAMPLE LOCATION
- MW114 — MONITORING WELL LOCATION
- FIRE HYDRANT LOCATION
- UTILITY POLE
- APPROXIMATE LIMITS OF SOIL TO BE EXCAVATED AND LANDFARMED SEPARATELY ON SITE
- APPROXIMATE LIMITS OF SOIL CONTAINING TCE TO BE THERMALLY DESORBED AND LANDFILLED

SOURCE: OHM REMEDIATION SERVICE CORP.
PROJECT No. 17257
DRAWING No. 17257-D8

DATE: 09/12/96 (SEH)
Xref: 17257-D8.DWG
I:\USERS\40919\SS-010\FIG6-1.DWG (PS= 1/100XP PLOT= CALBW)

FIGURE 6-1

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

SPILL SITE SS-010
PROPOSED REMOVAL ACTION

PARSONS ENGINEERING SCIENCE, INC.
DESIGN • RESEARCH • PLANNING
290 ELWOOD DAVIS ROAD • SUITE 312 • LIVERPOOL, N.Y. 13088 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

SECTION 7

EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

As previously discussed, there is a potential for VOCs and SVOCs to contaminate the groundwater and subsequently migrate off-site. If this removal action is not implemented, the threat exists that the contaminants will reach the groundwater and migrate downward and in the direction of groundwater flow. Should this occur, exposure to human populations, animals, or the food chain could occur.